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THE DYNAMICS OF RESILIENCE IN A CENTERING MEDITATION:
A LONGITUDINAL RANDOMIZED CONTROLLED TRIAL

A Dissertation
Presented to the
Faculty of the School of Education
The College of William & Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy

By
Stephanie Dorais

March 2021

THE DYNAMICS OF RESILIENCE IN A CENTERING MEDITATION: A LONGITUDINAL
RANDOMIZED CONTROLLED TRIAL

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To all those who turned to inner stillness for strength

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ABSTRACT

In use for centuries across nations, meditation is still one of the widely used interventions to promote holistic health. Despite its large research base, many forms of meditation in use still have yet to be subject to empirical research. Centering prayer has been an established contemplative practice since the third century and has recently gained popularity at the turn of the last century. Individuals practiced centering to find stillness and, through the stillness, their inner strength. Due to its lack of empirical evidence, centering practice has primarily remained in religious or contemplative circles outside instead of counseling treatment. Furthermore, it is almost entirely out of the young adult population's knowledge, a generation that has increasingly identified with spirituality over the years. Due to this potential match with the population and other stated needs of the college counseling field for complementary and alternative forms of treatment, the present study aims to test the effectiveness of a centering prayer meditation on resilience in the college population. Further, it seeks to examine the temporal dynamics of resilience during this intervention over four weeks.

To address this goal, I conducted a longitudinal randomized controlled trial where university students ($n = 150$) joined at random a treatment group or a control group. Each group took assessments measuring their resilience, hope, mindfulness, spiritual transcendence, and stress at three points in time with equal intervals of two weeks (T_1 , T_2 , and T_3). Also, they took a brief assessment of hope every morning and every evening for the duration of the study. At the onset of the study, participants in the treatment group received a brief online introductory training to centering meditation. Afterward, the study procedure requested them to practice centering for 10 minutes every morning and every evening for the study duration. After

meditation, they completed their brief assessments of hope, while the control group completed them at the same time without the meditation.

This study used two research methods from temporal dynamics, including growth curve modeling and time series analysis. The growth curve model indicated a statistically significant difference in resilience over four weeks between the treatment and control group ($p < .05$). The 4-week treatment had approximately a moderate within-group effect on the treatment group ($d = .48$). A subsequent growth curve model indicated that hope was a significant explanatory variable ($p < .05$) and within-subject mediator ($p < .01$) of resilience over time. Based on the hypothesis of this effect of hope on resilience, the study included a time series analysis analyzing the bi-daily levels of hope between the treatment group and control group. Using an ARIMA modeling procedure, the analysis detected that the treatment group had an ARIMA (1, 1, 0) model, indicating a statistically significant increasing trend in hope and autocorrelation to aid in forecasting, $p < .000$. The model accounted for 56% of the variance in hope while controlling for the trend in the data (stationary $R^2 = .56$). As expected, the control group did not have an increasing trend in hope, but it showed a forecastable model through its AR(1) and MA (1), $p < .000$.

Lastly, the study explored how other psychosocial properties of resilience such as mindfulness, stress, and spiritual transcendence could affect the trajectory of resilience over time. A growth curve model indicated that each variable had a statistically significant fixed effect on resilience over time, $p < .05$. Time served as a statistically significant random effect in the models of stress and spiritual transcendence, $p < .000$. Discussion of limitations and implications for counseling practice and research will follow.

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CHAPTER ONE: INTRODUCTION

This proposed study aims to examine the effectiveness and dynamic mechanisms of centering meditation in relation to resilience over a span of time. Meditation is one of the most established and researched interventions in world history (Alexander, 1931; Wallace, Benson, & Wilson, 1971; Walsh & Shapiro, 2006). Records of its positive impact on mental health can be traced back to ancient religious literature, and the records extend to current research within the fields of counseling, psychology, and neuroscience (Vieten et al., 2018). Nevertheless, despite the wide variety of meditations and their varying effects on the human condition, much is still left to examine (Sedlmeier et al., 2012; Vieten et al., 2018; Walsh & Shapiro, 2006). Experts draw attention to a few critical areas of research, including a) the effectiveness of meditation on strengthening positive human traits (Vieten et al., 2018) and b) how meditation confers its positive outcomes on people. This study's two-fold purposes comprise determining the effectiveness of the Centering Prayer meditation on resilience and examining the underlying dynamics of its longitudinal influence on resilience. I will examine the relationship between Centering Prayer and resilience through experimental and longitudinal methods to meet both objectives.

Background

Meditation first received significant clinical attention because of its calming effect on stress amongst its many therapeutic benefits (Benson, 1977). Western investigation into the relationship between meditation and resilience originated in stress research in the 1970s (Wallace et al., 1971; Beary & Benson, 1974; Benson, 1977). Stress is an enduring public health concern (Maykrantz & Houghton, 2020), and meditation has been a leading intervention in research that has helped address this concern (Sedlmeier et al., 2012). To this day, research on the buffering

effects of meditation on stress is widespread, thereby influencing a wide range of clinical interventions and populations (Sedlmeier et al., 2012; Walsh & Shapiro, 2006). Countering this health concern from a strength-based approach, the positive psychology movement contends that people can surmount stress and adversity through positive forces such as resilience and hope (Arnau et al., 2007; Seligman, 2011). Positive psychology is a discipline that diverges from a tradition of focusing on pathology and mental illness by focusing on positive experiences, traits, and emotions that add meaning and purpose to human life, which can be referred to as either thriving or flourishing (Seligman, 2011). It focuses on the positive in the face of pain as two independent psychological processes (Duckworth, Steen, & Seligman, 2005). From this standpoint, it is possible to explore the dynamic relationship between the positive and the painful. I built my study on this foundation to investigate patterns of resilience and hope through a centering meditation.

College Population

As the need for building resilience is a widespread concern, I considered target populations that could greatly benefit from this research at this time. Currently, the population that critically needs home-based interventions to bolster resilience comprises college students. Students in higher education face an inevitably high degree of stress (Hartley, 2010; Im, Greenlaw, & Lee, 2018; Read et al., 2011). Limited financial resources, prevalence of substance use, and academic rigor are only some of the aspects of the encompassing period of stress that is college life. Although stress and mental health concerns are universal, college students are more likely to engage in poor coping mechanisms (for example, alcohol misuse, use of recreational drugs; Bland et al., 2012; Read et al., 2011). This finding is further substantiated by reports of mental health concerns, which have nearly doubled in the recent decades (Bamber & Morpeth,

2018), and many universities do not have the time, staffing, and financial resources to address the overwhelming needs of students who seek counseling services (Xiao et al., 2017). Consequently, countless college counseling centers across the country are forced to place students on waiting lists or refer them to off-campus resources (Iarussi & Shaw, 2016). Furthermore, during the COVID-19 pandemic, university counselors have been working tirelessly to reach their students through web-based means (for example, telehealth appointments and online mental health resources). Currently, more than ever, college counselors need alternatives to provide resources outside of traditional therapy to students. In a time and age when opportunities for therapy are scarce, a popular approach involves training students in meditation. Online mindfulness interventions, such as Koru Mindfulness (KM), have proven to be effective in reducing stress by bolstering psychological flexibility amongst college students (Forbes et al., 2018; Greeson et al., 2014). The efficacy, affordability, and applicability of these home-based, online meditations render them appealing and viable alternatives; however, the wide range of available meditative practices could benefit from further research. Meditation does not follow a one-size-fits-all approach, and it is important to consider the various characteristics of meditations and match them to the needs of different populations (Burke, 2012a). A meditation practice that has been receiving increasing popularity is a spiritually oriented meditation named Centering Prayer. Its empirical research is still in development (Fox et al., 2016) and its unique features could potentially match the needs and characteristics of the college population.

Centering Prayer as a Meditative Intervention

Rooted in the contemplative practices of the Desert Fathers and Mothers in the fourth century, Centering Prayer is a meditation that Trappist monks Keating, Menninger, and

Pennington reintroduced in the twentieth century (Pennington et al., 2002). Its revival in the modern era not only invites empirical examination but also meets a new generation of spiritual interest (Fox et al., 2016). Emerging adults are increasingly identifying as spiritual at rapid rates (Longsdorf, 2018). “Millennial spirituality” is a new and unique landscape, and it could benefit from greater access to interventions that incorporate a spiritual identity and mental health (Longsdorf, 2018, p. 55). A growing population of spiritually identifying individuals has significant implications for meditative practice. Benson and Stark (1996) identified a phenomenon they called the *faith factor* through the seminal work on the *relaxation response*. Simply put, individuals who incorporate their spirituality into their meditation practice exhibit more positive physiological responses to meditation (for example, decreased cortisol and lower heart rate) when compared to those who separate their spirituality entirely. Subsequent research has provided further evidence that incorporating one’s personal spirituality into their meditative practice can lead to improved therapeutic outcomes (Benson, 1985; Wachholtz & Pargament, 2005). Nevertheless, even though Centering Prayer has gained increasing popularity in recent decades, it has yet to undergo experimental research design to determine its efficacy (Fox et al., 2016). In general, a critical task for the counseling field involves distributing evidence-based practices that meet the unique needs of diverse populations. Therefore, I selected meditation with the aim of testing its efficacy for the population towards which it is geared.

Problem Statement

Effective Interventions for College Population

Complicated social life challenges, limited financial resources, prevalence of substance use, and academic rigor are only some of the stressors encountered by the Eichholtz college population (Im et al., 2018; Read et al., 2011). Mental health concerns in colleges have nearly

doubled in the recent decades (Bamber & Morpeth, 2018). Furthermore, the most common age when one experiences a potentially traumatic event is approximately 18 years (Anders et al., 2012). Although stress and mental health concerns are universal, college students are more likely to possess inadequate coping mechanisms (for example, alcohol misuse, use of recreational drugs; Bland et al., 2012; Read et al., 2011). Unfortunately, many universities do not have the time, staffing, or financial resources to address the overwhelming needs of students who seek counseling services to combat these growing mental health concerns (Xiao et al., 2017). Universities across the country must either add students to waiting lists or refer them to off-campus resources (Iarussi & Shaw, 2016). In addition, during the COVID-19 pandemic, university counselors have been working tirelessly to reach their students through web-based means (for example, telehealth appointments, online mental health resources).

With mental health needs steadily increasing on campuses, the college counseling field has issued a widespread call for evidence-based complementary and alternative treatments to supplement and reduce the burden on in-person counseling (Xiao et al., 2017). Meditation has become a prevalent mental health resource for university students, and students have benefited from online meditation resources (e.g., Headspace, Koru Mindfulness; Forbes et al., 2018; Greeson et al., 2014). So far, the research on the efficacy of these resources has been limited to non-sectarian mindfulness-based meditations. However, research has shown that spirituality potentiates the effectiveness of meditation interventions, thereby increasing their impact (Benson & Stark, 2009; Carlson et al., 1988; Wachholtz & Pargament, 2005). This indicates that a spiritually oriented meditation could potentially better meet the needs of the college population. In addition, access to effective spirituality-oriented meditations could also be of greater interest to some college students. In the last ten years, 90 percent of college students have expressed

interest in spirituality (Astin et al., 2010), and this wave of generational interest, which is popularly called millennial spirituality, is only rising (Longsdorf, 2018). Addressing clients' spiritual wellness is also critical to multiculturally competent counseling, as is having the ability to offer a meditation to college students that seems more closely associated with their spiritual worldview (Gutierrez et al., 2015). However, empirical support (for example, findings from randomized controlled trials) for spiritual meditations is sparse. Hence, the primary aim of this study is to examine the effectiveness of a unique online centering meditation and its impact on resilience and hope to fill this gap in the literature.

Gaps in Literature of Dynamics

Lastly, experts have been invoking researchers to continually investigate the mechanisms of change within meditation. Many of the explanatory factors of meditation, which lead to positive outcomes such as resilience, are still missing in the literature (Hölzel et al., 2011; Petrik & Cronin, 2014; van der Velden et al., 2015). These underlying, theoretical factors, through which an intervention is conducted, lead to therapeutic outcomes that are known as *mechanisms of change* (Petrik & Cronin, 2014). The exploration of the mechanisms in any intervention has major implications for the counseling field. Improvement and development of any therapeutic treatment rests on a clear mechanistic explanation of the approach (Petrik & Cronin, 2014; van der Velden et al., 2015). Based on the literature, the constructs of mindfulness, spirituality, and hope have all demonstrated an influential relationship between meditation and resilience (Dorais et al., unpublished manuscript; Salmabadi et al., 2016). However, these studies were neither experimental nor longitudinal. Therefore, an analysis that examines the time-varying effects and rates of change of these constructs on resilience could help partially fill the gap in the research literature.

Contemplative Intervention

The intervention in the study, Centering Prayer, has deep spiritual roots and is a part of an extensive taxonomy of contemplative practices. In this chapter, I provide a brief introduction to this intervention, which is followed by a more extensive review in Chapter Two. This introduction describes the intervention's position in terms of contemplative practices, meditation, and spiritual practice. Furthermore, I elaborate on its use as a non-denominational, centering meditative practice.

Contemplative Practice

Contemplative practice encompasses a wide range of religious, spiritual, non-sectarian practices that promote mindfulness and a sense of purpose (Plante, 2010). Although a wide array of taxonomies appears in the literature, I present a basic organization based on the Tree of Contemplative Practices (Center for Contemplative Mind in Society, 2020). The subcategories include stillness (e.g., meditation), generative (e.g., Lectio Divina), creative (e.g., journaling), activist (e.g., pilgrimage), relational (e.g., storytelling), movement (e.g., yoga), and ritual or cyclical practices (e.g., spiritual retreats). Each practice varies in terms of the function but converges with respect to the purpose—to cultivate meaningful awareness and connection with the self. This study focuses on the category of *stillness*, which includes a large body of meditative practices. The mind is naturally discursive and prone to either wander or ruminate (Killingsworth & Gilbert, 2010). Although a wandering mind can facilitate creativity and stress adaptation (Smallwood & Andrews-Hanna, 2013), prolonged state during which a mind wanders generally leads to negative mood states (Killingsworth & Gilbert, 2010). The practice of stillness cultivates awareness and deepens connections with the elements and aspects that an individual finds meaningful (Keating, 2002). The positive effects span the realms of mental health,

spirituality, and physiology. In the recent decades, this contemplative practice of stillness has proliferated the research of mental health with its association to positive clinical outcomes (Hilton et al., 2017; Hopwood & Schutte, 2017; van der Velden, 2017).

Meditation

The type of contemplative practice that promotes stillness can largely be classified under meditation. Meditation itself houses a wide range of practices, and the literature presents a host of different classifications. Goleman (1988) divided meditation into two major categories while building a taxonomy of meditation: a) concentration and b) mindfulness. Goleman's concentration category describes a centering approach to meditation. Centering redirects wandering modes of consciousness through intentional focus on a single element. The element varies based on the meditative practice, but common focus areas include the breath, a visible object, and a sacred word or passage. Mindfulness, on the other hand, describes a heightened awareness of one's surroundings as opposed to that of one element. Although it can be defined as a state of detached awareness, mindfulness should not be confused with a wandering mind. A wandering mind loses the focus of the here-and-now and places it on whatever thought enters the mind (Killingsworth & Gilbert, 2010). Although concentration and mindfulness have different functions, they both converge in terms of their outcomes—an altered consciousness that is more aware of one's self and surroundings (Goleman, 1988; Plante et al., 2010).

Centering Prayer

Centering Prayer is a spiritual, concentration meditation rooted in early Christian traditions (Plante et al., 2010). A person leverages their awareness to what they hold sacred in order to center their thoughts and calm their mind. Although the function of Centering Prayer is stillness, the goal is to experience *contemplative prayer*—inner transformation by connecting the

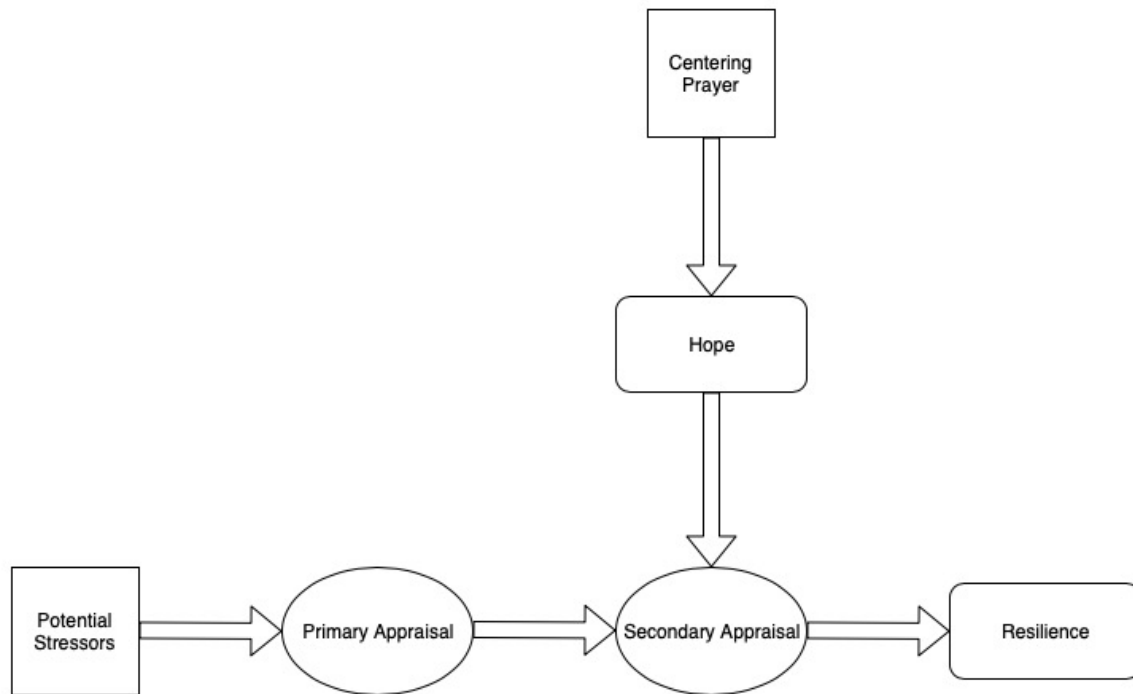
inner self with the divine (Keating, 2002). Centering Prayer comprises meditation that provides a space for contemplative prayer—a form of prayer that dates back to early Christian history. In the middle of the twentieth century, Trappist monks Thomas Keating, William Menninger, and M. Basil Pennington developed Centering Prayer as a meditation practice to provide a space for contemplative prayer, thereby reviving its practice in modern times. Although it is based in the Christian tradition, Centering Prayer can incorporate pluralistic spirituality or non-sectarian practice, in a way that closely resembles other meditations rooted in religion such as Transcendental meditation (arguably rooted in Hinduism) or Vipassana meditation (rooted in Buddhism; Center for Contemplative Mind in Society, 2020).

Theoretical Frameworks

As previously mentioned, this study draws from the empirical scholarship in positive psychology. However, the foundation of the study design is also based upon several other theoretical frames, including the Transactional Model of Stress and Coping Theory (Lazarus & Folkman, 1984) combined with the broaden-and-build theory (Fredrickson, 2001). I combined them to show the manner in which Centering Prayer influences resilience through a pathway of hope and changes in cognitive appraisal. The Transactional Model of Stress and Coping Theory and broaden-and-build theory further explain the connect. Figure 1 presents an integrated conceptual model I used in the study design.

Figure 1

Integrated Conceptual Model of Appraisal, Centering Prayer, Hope, and Resilience



Transactional Theory of Stress and Coping

Several theoretical models guided me while investigating the effectiveness of Centering Prayer and its dynamic relationship with resilience. The Transactional Model of Stress and Coping Theory (Lazarus & Folkman, 1984) describes the dynamic phenomenon of the manner in which individuals adapt to stressors in their surroundings (Lazarus & Folkman, 1984). Adversity does not lead to one specific outcome within this model (for example, pain, loss, and depression). Instead, the outcome depends on a series of *transactions* and *appraisals* between a person and their environment.

Emotion and Adaptation

Lazarus and Folkman's Transactional Model of Stress and Coping Theory describes the manner in which humans adapt to stress by appraising their surroundings and utilizing coping resources. Emotion can play a key role in adaptation to stress and influence appraisal. Although research historically focuses on emotion as a treatment outcome or a predictor of well-being, it can also serve as an explanatory variable in behavioral change (Fredrickson, 2001). Lazarus (1991) explained that the coping mechanism chosen by people reflects their emotions at the point of time. Furthermore, a person's emotions can influence appraisal of a stressor and, consequently, their coping mechanism selection as well (Fredrickson, 1998). Negative emotions (for example, fear) narrow the options of coping mechanisms from which a person can choose the one most suited to their needs. Take into consideration the binary fight-or-flight reaction triggered by fear. In this fearful emotional state, people perceive fewer pathways of how to overcome a challenge. However, through research studies in the domain of positive psychology, Barbara Fredrickson contended that emotion can have positively influence cognitive appraisal and overall adaptation stress.

Broaden-and-Build Theory

According to Fredrickson's research and broaden-and-build theory, positive emotions broaden a person's *thought-action repertoire*. It allows them to perceive a wider range of coping mechanisms that are available at their disposal. In other words, positive emotion bolsters positive cognitive appraisal. For instance, Chang and DeSimone (2001) found that hope has a positive impact on secondary appraisal—the kind of appraisal in which a person chooses the type of coping response to stress. Individuals are more likely to increase their resilience in face of adversity due to the availability of more positive coping mechanisms from which one can choose. The implications of this model on this study relate to the intervention and the

explanatory variables that I examined. If centering can increase people's positive emotions, then it could also potentially foster positive cognitive appraisal in the transaction between stress and coping. I aim to examine hope as an explanatory variable over a certain span of time along with other positive traits, such as spiritual transcendence and mindfulness, in order to explore the dynamic relationship between Centering Prayer and resilience.

Lastly, this study hinges on the idea that Centering Prayer can increase hope. The foundation heavily relies on the works of King et al. (2020), who demonstrated a significant correlation between spirituality and hope ($\beta = .27, p < .000$). Furthermore, Fox et al. (2016) provided preliminary evidence that centering increases spiritual health. I build the theoretical framework for this study from these recent research findings and the aforementioned theories.

Resilience

Mental health research has primarily concentrated on the negative outcomes of stress on the human condition (Seligman, 2011). However, a growing body of research explores the human capacity *to resilire* or 'to bounce back' in the face of adversity (Reghezza-Zitt & Samuel Rufat, 2015). Resilience, as a psychosocial construct, is associated with one's ability to adapt to stressful changes and surmount the challenges before them (Southwick et al., 2014). Research from the fields of psychology, neuroscience, and philosophy examine the various angles of resilience, each revealing its complexity and significance with respect to mental health. The need to examine the underlying processes of resilience was apparent from the early years when psychology research was conducted on resilience in the 1970s (Garmezy, 1974). Garmezy, a pioneering psychologist, adamantly contended that the future of resilience research "require[ed] a methodologically rigorous approach to its data analysis," thereby stressing the need for longitudinal approaches that could examine "multi-factorial causal pathways" (Rutter, 2012, p.

335). Garmezy mentions that resilience is not a fixed state but rather a series of changes that continually occur over a span of time. He also implied that resilience depends on various explanatory variables, which require further scrutiny. Subsequent research has explored and confirmed several of these factors, such as a sense of meaning and social support (Rutter, 2012; Southwick et al., 2014; Werner, 2000). Furthermore, analysis of repeated measures has continually suggested that resilience is indeed dynamic rather than static. However, much is still left to examine. The purpose of this study is to continue the work that Garmezy invoked researchers to fulfill. The process of resilience describes an intricate interplay amongst protective factors, stress, and time (Rutter, 2013). Since Garmezy's seminal research on resilience, three elements have emerged from resilience, which describe it as *dynamic*, *transactional*, and *teachable*. All three elements lay the groundwork through which intervention can increase resilience in people.

Resilience as a Teachable Process

The driving force behind Metatheory of Resilience and Resiliency (MRR; Richardson, 2002) is the fact that people can learn resilience. Individuals have the agency to surmount stressful challenges with resilience. In his MRR model, Richardson (2002) describes the various ways in which individuals experience outcomes of resilience under stress. The learning process concerns the transaction with stress, protective factors, and the dynamics of resilience. However, the teachable element of resilience has significant implications for counseling research. If resilience is teachable, then an intervention that increases resilience becomes feasible. Subsequently, questions are raised about the relationship between resilience and stress while determining an appropriate intervention.

Resilience as a Transactional Process

According to the MRR model, individuals can come out of a stressful experience with lesser, equal, or greater resilience than they possessed earlier (Richardson, 2002). The outcomes depend on the balance between protective factors and environmental stress, which Lazarus and Folkman (1984) discuss in their Transactional Model of Stress and Coping Theory. Lazarus and Folkman (1984) focus on the balance between stress and protective resources, which they refer to as a *transaction*, whereas Richardson focuses on the outcomes of resilience in his model. In this paradigm, resilience is clearly a function of two independent forces—stress and protective factors or coping resources. Consequently, the concept of resilience as a static trait becomes less feasible. Therefore, modern researchers embrace the concept of resilience as a dynamic construct (Southwick et al., 2014; Rutter, 2002).

Resilience as a Dynamic Process

The dynamic nature of any psychosocial construct refers to the manner in which its patterns and trajectories fluctuate over a span of time (Fortes et al., 2005; Kuppens & Verduyn, 2017). The dynamics of resilience refers to how people can respond with varying levels of resilience at different points in time and in different situations (Rutter, 2002). For instance, it describes how a high school student can excel academically and socially despite experiencing evident stress. However, the same student can suffer from dramatic mental health and academic changes upon entering college after graduating from high school the next year. Although fluctuation in resilience is expected and natural, it is still missing in research literature. Theoretically, researchers agree that resilience depends on protective factors and environmental stress, which can continually change over a span of time. However, much of the fluctuations of resilience are yet to be examined. Specifically, the impact of an intervention, such as Centering

Prayer, on promoting an upward trajectory and stable increase of resilience is still unknown in the literature.

Stress

According to Garmezy (1974), resilience can only reveal itself under a state of stress. If we consider this phenomenon from the lens of Transactional Model of Stress and Coping Theory, then it can be specified that individuals manage their stress by appraising their situation and the availability of coping mechanisms. In this study, I used the operational definition of *perceived stress* as a psychosocial construct of interest (Cohen et al., 1988). Perceived stress does not describe the stressor itself but rather a person's thoughts and emotions about the stressor. If stress is a function of cognitive appraisal in the framework within the study, then I selected a measurable construct that reflected either appraisal or perception. Consequently, perceived stress neither describes the category nor degree of stress in a person's life. Instead, it reflects the severity of stress felt or experienced by a person on the basis of their appraisal of the stressor.

Protective Factors of Resilience

According to Richardson's (2002) MRR model, the dynamics of resilience and their transaction with stress depend on protective factors (for example, social support and economic stability). Richardson highlighted the role that spiritual factors can play in resilience by following the same direction as the larger positive psychology movement. Although these factors have less empirical support, they are nevertheless a large part of the MRR model in relation to ecobiopsychospiritual homeostasis. Therefore, analysis of their protective roles in resilience could benefit from further research. In addition, positive psychology examines the spiritual principles that strengthen and sustain humans (for example, hope, courage, and transcendence;

Templeton, 2002). Templeton described the works of Snyder and other positive psychologists as the restoration of the science of psychology to its original tenet—“understanding the power of the human spirit to benefit from life’s challenges” (Templeton, 2002, “Foreword”, para. 3). As the science of the human spirit, positive psychology operationalizes and examines spiritual principles and subjects them to scientific scrutiny by examining the dynamic roles played by them in human psychology. Not only did I measure the relationship between resilience and a spiritual intervention but also specifically examined factors such as hope, spiritual transcendence, and mindfulness.

Hope

Hope is a thread that weaves through the fields of psychology, philosophy, religion, and spirituality. Depending on the kind of literature, its descriptions can range from a motivational psychosocial construct to a fruit of the Holy Spirit. Despite the diverse contexts in which it is found and portrayed, hope presents as a mediating factor between contemplative practices and resilience (Dorais et al., in progress). In addition, Chang and DeSimone (2001) found that hope positively influences appraisals of stress amongst college students. Therefore, I aimed to explore the dynamic influence of hope on meditation and resilience over the course of time. In the fields of psychology and counseling, the most established framework is Snyder’s cognitive-motivational model, which is derived from Hope Theory (2002). In this model, hope is a *goal-oriented* psychosocial construct instead of a feeling or emotion. Snyder (2002) operationalizes hope as a mindset that focuses on a) generating goals and b) finding ways to achieve these goals. In other words, a hopeful person must not only have the agency or motivation to achieve their goals, but they must also possess the cognitive ability to map pathways of how to achieve their goals.

Mindfulness

Mindfulness is one of the largest components involved in any meditation when considering explanatory variables (van der Velden et al., 2015). It is such as an integral part of meditation, in particular, that the two terms are often used interchangeably in counseling literature (Kemeny et al., 2012). For instance, one of the most widely accepted meditation-based interventions itself is named Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 2003). Simply put, mindfulness is the state of paying attention to the present moment with purpose and non-judgment. On the other hand, contemplative practice is an activity that can cultivate mindfulness (Garland et al., 2015; Kabat-Zinn, 2003), but one can be mindful of self and the environment without the help of contemplative practice.

Generally, mindfulness comprises three major components (Shapiro et al., 2008). As one familiar component, mindfulness hinges on *attention*—giving and sustaining focus to the present. The present moment can include physical sensations, environmental characteristics, thoughts, and feelings. The word “mindfulness” is derived from the Indian concept of *dharma*, which one of its loose translations are “the way things are” (Kabat-Zinn, 2003, p. 145). Therefore, first, as the mind wanders, mindfulness redirects attention back to the way things are in the moment. Second, mindfulness also involves *purpose* (Shapiro et al., 2008). When an individual is mindful, they pay attention to the present moment for a conscious reason. For instance, an individual could focus on a sacred word in Centering Prayer to connect with God (Keating, 2002). Third, the final component involves attitude—specifically, a non-judgmental and accepting stance. A state of focusing on the present with a critical attitude, which is natural to the human mind, loses the essence of mindfulness. It is also important to distinguish that

mindfulness does not solely focus on positive experiences or sensations. It pays attention to the vast spectrum of pain but does so without judgment or evaluation.

Spiritual Transcendence

Various operational definitions of spiritual transcendence are available in the literature. Pargament (1999, p. 9) describes spirituality as a “search for the sacred,” which can include a belief or relationship with the divine. Piedmont (2001) positions spirituality as a motivational trait, which is distinct from biological or psychological motivation, that influences psychological driving factors and human behavior (Piedmont, 2001). According to Piedmont, spirituality encourages people to find meaning, change behaviors, or, as Pargament frames it, search for the sacred. The call for spiritual integration in counseling is increasing, and individuals generally express a need for holistic care that acknowledges the spiritual aspects of their psychological well-being (Ekşi & Kardaş, 2017). Contemplative practice can seamlessly integrate spirituality into counseling by leveraging its roots in various faith-based tradition (Plante et al., 2010). However, spirituality sometimes comprises a construct that is excluded in related research, even though it is increasingly becoming a part of scientific inquiry. This research gap could be indicative of a larger system of excluding spirituality in treatment. Plante et al. (2010) describes how wellness experts distribute contemplative practices all together by stripping them of their spiritual origins and marketing them as non-sectarian mindfulness-based techniques. For instance, the widely used Eight Point Program (EPP; Easwaran, 1978/1991) is a structured meditation program that is designed for individuals with and without spiritual affiliation. However, as contemplative practice is rooted in spirituality, it is not surprising to note that desired outcomes (for example, relaxation and psychological adjustment) are greater for individuals who incorporate their own spirituality into the practice (Plante et al., 2010). For

instance, the combination of spirituality and meditation relates to significant increases in pain tolerance and positive mood in comparison to meditation without spirituality (Wachholtz & Pargament, 2005). Therefore, it is a relevant factor that needs to be measured when examining the mechanism of contemplative practice.

Significance of the Study

The results of the study could potentially address a critical need in the college counseling field and fill several gaps in the counseling research literature. The study will primarily test a meditation that allows college students to participate outside the boundaries of traditional therapy. It broadens the scope of resources for college students while reducing the load on college counselors who offer face-to-face therapy. In addition, the study could help provide answers for the underlying mechanisms of change behind meditative practice, including the time-varying influences of hope, mindfulness, and spiritual transcendence. It will also provide additional findings on the dynamic nature of resilience and the manner in which it relates to meditation.

Research Questions

The research questions are as follows:

1. Is there a significant difference in levels of resilience (as measured by the Response to Stressful Events Scale [RSES; Johnson et al., 2011]) between individuals who participate in a daily meditation and a comparison group?
2. In both the treatment and control, will the autocorrelative patterns of hope (as measured by the State Hope Scale [SHS; Snyder et al., 1996]) fluctuate as a state, remain stationary as a trait or disposition over time, or exhibit an increasing trend

(measured through an Autoregressive Integrated Moving Averages [ARIMA] time series model)?

3. What is the trajectory of resilience when accounting for hope (as measured by the SHS) as an explanatory variable or mediating variable?
4. As an exploratory question, what are the roles played by mindfulness (as measured by the Cognitive and Affective Mindfulness Scale – Revised [CAMSR; Feldman et al., 2007]) and spiritual transcendence in the trajectory of resilience over time?

Research Hypothesis One

There will be a significant difference in resilience (as measured by the RSES) between a group of individuals who participate in a daily meditation and individuals from an intent-to-treat sample.

Research Hypothesis Two

The fluctuations of hope (as measured by the SHS) will be non-stationary in the comparison group and they will stabilize and increase in trend in the treatment group.

Research Hypothesis Three

Hope (as measured by the SHS) will serve as a significant explanatory variable and mediating variable in the trajectory of resilience over four weeks.

Exploratory Research Hypothesis

There will be a significant correlation between Centering Prayer and the constructs of mindfulness, spiritual transcendence, and stress.

Conclusion

Chapter One provides an introduction to and rationale of the proposed study. It describes the primary constructs of interest, the significance of the study, and a basic research design. Ultimately, this proposed study aims to explore the manner in which a spiritual meditation influences human resilience through the ever-changing levels of hope, spiritual transcendence, and mindfulness experienced by people. The findings will hopefully provide viable means to college counselors, thereby enabling them to offer additional mental health resources to college students with the aim of reducing the number of students who have been waiting to receive therapeutic treatment. In addition, many therapeutic treatments aim to increase resilience. With a deeper understanding of its underlying dynamics over time, researchers may be able to optimize current treatment to provide even greater outcomes of resilience.

CHAPTER TWO: REVIEW OF THE LITERATURE

Chapter Two presents a review on the literature of meditation, Centering Prayer, the study's theoretical frameworks, the constructs of resilience and hope, and the need for a meditative intervention for the college population. The chapter begins with an overview of contemplative practices followed by a more detailed elaboration of the Centering Prayer meditation. Subsequently, I expanded on the framework of Transactional Model of Stress and Coping Theory (Lazarus & Folkman, 1984) with a theoretical lens to illustrate the manner in which Centering Prayer generates resilience while highlighting the seminal and most recent supporting studies. In the following sections, the chapter introduces and elaborates on the major theories and empirical research associated with the two major constructs of interest, namely resilience and hope. Lastly, I discuss the importance of examining the dynamics behind Centering Prayer, which lead to increased resilience in terms of implications for counseling research and intervention research.

Meditation

Forms of meditation are interwoven across various cultures and religious traditions, which range from ancient Hindu practices to Catholic mysticism (Plante et al., 2010; Walsh & Shapiro, 2006). Due to its immersion in various cultures, religions, and historical timelines, it is challenging to establish a consistent operational definition in the literature (Plante et al., 2010; Walsh & Shapiro, 2006). Meditation burgeoned and proliferated in twentieth century through the disciplines of physiology and psychology (Sedlmeier et al., 2012; Walsh & Shapiro, 2006). According to a modern description, meditation is a first-person, reflective activity that focuses the mind on an experience (e.g., breathing, uttering the sacred word, moving the body) and directs it away from unregulated modes of consciousness (Schmalzi et al., 2014; Walsh &

Shapiro, 2006). Its ability to focus attention and relax the nervous system are some of its greater contributions to clinical application. Therefore, the fact that therapeutic intervention has become a leading purpose for meditation is not surprising (Sedlmeier et al., 2012; Walsh & Shapiro, 2006). Interventions harness the strengths of meditation and generate a range of positive clinical outcomes, which include decreased stress, anxiety, depression, perceived stress, post-traumatic stress, and symptoms of borderline personality disorder (Falsafi, 2016; Hilton et al., 2017; Hopwood & Schutte, 2017; Kabat-Zin, 2003; Keng & Tan, 2017; Thompson & Waltz; Oman et al., 2008). Despite these desirable therapeutic outcomes, they are considered to reside at the peripheries with respect to the original perspectives of meditation. The focus was on inner transformation (Keating, 2002) or “refining the mind” (Walsh & Shapiro, 2006, p. 228) in the early traditions of meditation. The various purposes of meditation give rise to the complexity and plethora of different classifications of meditation.

Taxonomies of Meditation

Although the therapeutic use of meditation is widespread, a standardized taxonomy of meditation has not yet been established (Nash, Newberg, & Awasthi, 2013). The ambiguous classification of meditation does not result from a lack of effort on behalf of researchers. To the contrary, the literature presents a wide variety of taxonomies, depending on how they approach the multi-faceted nature of meditation. A number of dimensions compartmentalize meditation, including but not limited to intention (for example, compassion and union with God), state of consciousness (for example, attention to the present moment and altered state of transcendence), cultural tradition (for example, Hinduism and Taoism), cognitive method of practice (for example, open monitoring and focused attention), and features of practice (for example, non-verbal and stationary). Although each category houses a number of meditative practices, experts

can disagree on how to allocate them. Consequently, the literature suffers from too many non-standardized classifications rather than a lack of classification.

Nash et al. (2013) classify meditations based on the following nine taxonomic keys: a) cognitive strategy, b) conceptual focus, c) beliefs, d) visual function, e) body movement, f) auditory function, g) posture, h) intrinsic or extrinsic process, and i) specific recommendations. This perspective uses a third-party approach, e.g., it seeks the aid of one who is not experiencing the meditation to classify it through observation. However, this approach differs from other approaches in which a person would have to undergo and practice the meditation to classify it. For instance, Travis and Shear (2010) argued in favor of a category based on the experience of transcendence. In other words, one person could intend to practice the same meditation twice. However, they would experience two separate meditations if they transcend to an altered state of consciousness on only one occasion (Nash et al., 2013). A more recent taxonomy includes breaking meditation into attentional (for example, sustained focus), constructive (for example, promotion of positive qualities), and deconstructive processes (for example, alteration of conscious states; Schlosser et al., 2019). However, this taxonomy is not widely used yet.

Goleman (1988) provides a binary breakdown of meditation groupings that comprise *concentration* and *mindfulness*. Concentration meditation redirects wandering modes of consciousness to a single element through intentional focus (Sedlmeier et al., 2012). The element varies based on the meditative practice. However, common foci include breath, a visible object, a sacred word, or a mantra. The act of concentrating on a symbol allows the mind to pause its mental cognitions and emotions. Mindfulness meditation describes non-attachment to thoughts, and the mind increases awareness of its present surroundings without judgment. Although concentration and mindfulness have different functions, they both converge in their outcomes—

an altered consciousness that is more aware of the one's self and surroundings (Goleman, 1988; Plante et al., 2010). Other taxonomies add *devotional meditation* as another category (Priester et al., 2009; Young, DeLorenzi, & Cunningham, 2011). Practitioners of devotional meditation usually engage in a form of contemplative prayer wherein they seek spiritual union with the divine. A common reported outcome of devotional meditation is *spiritual transcendence* (Young et al., 2011). Spiritual transcendence refers to the human capacity to shift their awareness into another larger paradigm, and this concept historically appears in almost every world religion or walk of faith (Piedmont, 1999). Fox et al. (2016) found a significant association between Centering Prayer and increased levels of spiritual transcendence. However, the empirical literature on the connection leaves room to explore the connection. It is common for many of these categories to overlap. For instance, another binary taxonomy comprises 'be here now' and 'be there now' meditations (Gutierrez, 2014). In other words, certain meditations will focus on present awareness ('be here now'), whereas others may focus on transcendent, spiritual connection ('be there now'). These are not additions to previous meditations but rather other dimensions to the same meditations. For instance, meditations such as Centering Prayer is both a devotional and concentration meditation that allows people to simultaneously 'be here now' and 'be there now'. Its complexity partially explains why it could benefit from further study in comparison with other forms of meditations that have undergone extensive empirical examination. I discuss existing research on modern meditations and address the need to further examine Centering Prayer in this section.

Emergence of Modern Mysticism

Meditation is particularly known for its prevalence in eastern religions (for example, Zen meditation; Plante et al., 2010). The earliest records of Western meditation can be traced back to

the early Christians known as the Desert Father and Mothers, who advocated for and popularized a lifestyle of contemplation in the Middle East, Mediterranean regions, and Egypt (Keller, 2005). Western practices of meditation did not hail from the spread of the Eastern traditions to the West. Meditation was integral to early Christianity under the name of *contemplation*. At the turn of the fourth century, the Roman institutionalization of Christianity threatened the original lifestyle of Christian faith. When religious persecution was no longer imminent, early Christians noticed their faith had begun to transform from a spiritual lifestyle to an institutionalized belief system. They began an exodus to the deserts surrounding the Middle East and African regions to preserve a contemplative Christian life, thereby earning the names the Desert Fathers and Mothers. They cultivated contemplative lifestyles, practiced meditation and prayer, and served as spiritual guides for several centuries. The desert traditions birthed mysticism, which would later evolve into the Celtic, Benedictine, and Orthodox monasticism of the middle ages and continue up to the present times.

Relevant Research

Eastern meditation had carried over to the West, sparking empirical research in the 1930s, while contemplative practice remained active but isolated to monasteries. However, the field of psychology still gave little clinical application or empirical examination with respect to meditation for several decades (Loizzo, 2013). Early research in contemplative practice was predominantly sparse (Anand et al., 1961; Bagchi & Wegner, 1957; Coster, 1934; Das & Gastaut, 1955). Research reached a turning point through a study on Transcendental Meditation, which was conducted in the discipline of physiology (Beary et al., 1974; Benson, 1977; Loizzo, 2013; Wallace et al., 1971). In 1971, Wallace et al. revealed that meditation generates a unique wakeful hypometabolic state—a physiologic state that is similar to the state of deep sleep in

which individuals are still conscious and responsive. Eastern traditions, such as Buddhism and Taoism, identified this state as *samadhi*—a tranquil but alert state brought about by meditation—for several centuries (Jevning, Wallace, & Beidebach, 1992). In a Harvard laboratory, physiologists Wallace et al. (1971) identified unique parasympathetic responses (for example, lower oxygen consumption and decreased respiratory rate) in the meditating body and revolutionized meditation research. The seminal research in physiology launched an array of studies that flow through the following two major streams: a) neuroscience and b) clinical application (Loizzo, 2013). Since then, meditation and stress research have been intricately interwoven in the fields of neuroscience, physiology, psychology, and counseling.

Clinical Research

Benson (1974), who conducted a study on the wakeful hypometabolic state and published the same with Wallace, expanded his research and presented his seminal work on the *relaxation response*—the hypothalamic reverse of the fight-or-flight response. The wakeful hypometabolic state belongs to a category of hypothalamic restorative processes that Hess (1957) described as “protective mechanism against overstress” (Hess, 1957, p. 40). Benson’s research contributed to the development of a variety of meditation programs that aim to reduce stress as well as several influential psychological studies (Davidson, Goleman, & Schwartz, 1976; Kabat-Zinn, 2003; Sedlmeier et al., 2012). Over the years, counselors and psychologists have adopted many contemplative practices in structured clinical interventions, and substantial number of supporting empirical evidence have followed suit (Walsh & Shapiro, 2006). These interventions represent the overwhelming number of interventions that are rooted in contemplative practice, which have received substantial empirical support and clinical use over the years (Hilton et al., 2017; Hopwood et al., 2017; Kabat-Zinn, 2003; Loprinzi et al., 2011). They have adopted different

forms (e.g., structured programs and guided practice) with various types of delivery (e.g., individual and group) through the years.

The program directly related to Benson's research is Stress Management and Resilience Training (SMART), which was developed at the Benson-Henry Institute (2020). SMART is an eight-week program that is designed to reduce stress and promote resilience through a structured series of breathing meditation, moving meditation, and techniques from Cognitive Behavioral Therapy (Loprinzi et al., 2011). The results of randomized controlled trials have demonstrated that participation in SMART significantly reduces stress and increases resilience amongst the general population (Rose et al., 2013), physicians (Sood et al., 2011), professors (Sood et al., 2014), and breast cancer survivors (Loprinzi et al., 2011; Sood et al., 2012).

One of the most widely accepted meditation programs is Jon Kabat-Zinn's (2003) MBSR program. A doctor and professor, Jon Kabat-Zinn merged his work on stress reduction with mindfulness based on Buddhism practice. He developed MBSR in the 1970s as an eight-week, non-sectarian program with the aim of reducing physical pain and stress through mindfulness and yoga. In the program, practitioners receive psychoeducation on meditating, practicing yoga, journaling, and participating in active group discussions. Practitioners learn to become aware of thoughts and feelings without reactivity and judgment through participation in these activities (Kabat-Zinn et al., 1985). Randomized controlled trials have demonstrated their effectiveness in positively shifting psychological distress (Lengacher et al., 2009), quality of life, mindfulness (Shapiro et al., 2011), anxiety (Vøllestad, Sivertsen, & Nielsen, 2011), post-traumatic stress (Polusny, Erbes, & Thuras, 2015), reported loneliness (Creswell et al., 2012), fibromyalgia (Schmidt et al., 2011), neurocognitive difficulties (Wetherell et al., 2017), and symptoms of menopause (Wong et al., 2018) in clinical as well as general populations.

Meditation not only influences stress reduction programs but also therapeutic paradigms (Sedlmeier et al., 2012), including Acceptance and Commitment Therapy (ACT; Bach & Hayes, 2002). ACT is a mindfulness-based intervention that promotes psychological flexibility to facilitate positive change (Hayes, 2005). Merging cognitive therapy with mindfulness, ACT teaches to identify and accept internal experiences without trying to control or fight them. Once people use mindfulness to navigate their inner struggles, they can choose active behaviors that can lead to their goals (Bach & Hayes, 2002). Like other mindfulness-based treatments, it is continuously subject to experimental research. Next to comparison groups, individuals participating in ACT have demonstrated decreased psychiatric rehospitalizations (Bach & Hayes, 2002), anxiety (Arch et al., 2012), chronic pain (Wetherell et al., 2011), and symptoms of obsessive-compulsive disorder (Hayes et al., 2010).

Modern meditative practices often integrate with other forms of therapy and create a hybrid intervention. Returning to the origin of meditative practice, researchers demonstrate that unaltered meditation is an effective form of treatment for a host of physical and psychological concerns (Ospina et al., 2008; Sedlmeier et al., 2012). Meditation is one of the most widely researched forms of treatment because of its continuous success with positive clinical outcomes (Walsh & Shapiro, 2006). Sedlmeier et al. (2012) provides a meta-analysis of the various approaches to meditation, including the means to facilitate transformed consciousness and self-regulation. It includes details of the range of clinical outcomes that is measured through meditative interventions, including but not limited to self-concept, intelligence, neuroticism, and perception. Ospina et al. (2008) describes an account of over 400 clinical trials that involve meditation interventions. It highlights how researchers use theory and previous studies to inform their studies on a diversity of diagnostic outcomes, such as insomnia, cancer, or substance use.

The meditation of interest generally comprised a mindfulness meditation, mantra meditation, or another non-denominational meditative practice while the therapeutic outcomes were diverse (Ospina et al., 2008; Sedlmeier et al., 2012). However, Centering Prayer as a meditation has received starkly less empirical attention, even though early studies suggest a relationship with positive therapeutic outcomes (Fox et al., 2016; Johnson et al., 2009).

Centering Prayer

Centering Prayer, sometimes referred as “the prayer of the heart” (Kadloubovksy & Palmer, 1951, p. 192), is a contemplative method with roots in early spiritual traditions of Christianity. It operates off of the concept that all humans have a capacity for both cognitive and spiritual awareness. However, thoughts and cognitions occupy the forefront of the human mind, thereby leaving spiritual awareness blurred in the background. Centering Prayer is a method of surrendering one’s thoughts and ego for a small period of time and offering the capacity for spiritual attentiveness—a phenomenon that is known as *kenosis*. Kenosis can be defined as the action of laying down one’s cares and striving for the best outcomes and giving the heart the bandwidth to do what it naturally can—to attend to spiritual awareness. At that point, one’s mind lessens cognitive awareness in exchange for enhanced spiritual awareness. In this way, it teaches the mind to ground itself in spiritual awareness.

History

The roots of Centering Prayer can be traced back to one of the most famous addresses in Christian history (Keating, 2002). In the *Sermon on the Mount*, Jesus invoked the crowd in front of him to “enter your inner room...and pray in secret.” Three to four centuries later, Christians, who came to be known as the Desert Mothers and Fathers, considered Jesus’ words as an invocation to enter into the inner experience of oneself and praying in secret. They leaned on a

simple form of prayer named contemplative prayer, in which one's awareness temporarily leaves external experiences, enters inner experiences, and turns towards God. Christians, such as John of the Cross, relied on and authored works on contemplative prayer through the Middle Ages. Before the turn of the millennia, Trappist monks, such as Thomas Keating and Basil Pennington (1998), popularized Centering Prayer as a means to participate in contemplative prayer. In order to usher individuals into their own inner rooms for prayer, Centering Prayer uses the meditative focus on a sacred word that Goleman (1988) classified as concentration or centering. Beyond concentration, Centering Prayer is rooted in a dynamic relationship with the divine rather than a means to experience enlightenment or transcendence (Keating, 2002). The relationship begins by gaining an awareness of the spiritual core in oneself. The writings from the fourteenth-century work *The Cloud of Unknowing* describes a content-less prayer named *apophatic contemplation*. Mystics, such as Teresa of Avila and St. John of the Cross, contributed to the continuation of this tradition, which Keating teaches in Centering Prayer. It differs in terms of the content from *kataphatic contemplation*, with which religious individuals are generally more familiar. Kataphatic contemplation includes the use of content and rational thinking to reach out to God. Keating emphasizes that these two dimensions of contemplation do not differ from one another but rather complement each other. As apophatic contemplation is less familiar, it benefits from guidance in its process.

Process

The intention of Centering Prayer is not only to calm the mind but also to foster an ongoing transformative inner experience. It uses a centering technique to clear a space for contemplative prayer and, ultimately, a contemplative lifestyle. The goal is to guide individuals to achieve awareness of the divine indwelling, where God and their true selves reside (Keating,

2002). Centering Prayer guides practitioners through four basic steps (Keating, 1994). In the first step, the practitioner selects a symbol that they consider sacred. Common examples include *love*, *peace*, or *Jesus*. The use of a word is common to other types of meditation, such as Transcendental Meditation (Plante et al., 2010). As a contemporary Christian meditation, Keating (1994) describes the symbol as a sign of consenting to God to be present. It is important to note that a non-denominational practice is possible as well. In the subsequent step, the practitioner sits comfortably and uses the sacred symbol to anchor their attention and calm the mind. As the practitioner sits in stillness, it is natural for the mind to wander and pick up thoughts they had previously neglected to consider. During these moments, the person can consider the guidelines, “resist no thought, retain no thought, react to no thought” and simply return to the sacred symbol (Bourgeault, 2009, p. 24). The next step is to remain still for a specific period of time. In the fourth and final step, the practitioner can take a few minutes to reorient their awareness of the environment, let go of the sacred symbol anchoring their attention, and resume daily activities. In similar meditations, such as Jyoti meditation, practitioners can use concentration and a sacred word to establish a spiritual connection without a Christian lens (Gutierrez, 2014).

Research

Theologian and Augustinian priest Martin Laird suggested that “we are built for contemplation” (Laird, 2006, p. 1), as if the human body and mind together strengthen in a conscious, contemplative state. As meditation exponentially increased over the second half of the twentieth century, researchers began to examine the effects of contemplation through Centering Prayer. The research is still in its early stages, as only a few studies have examined it from an empirical standpoint. Therefore, its underlying impact on mental processes is still unclear (Fox et

al., 2015). In an early attempt to close the research gap, Newberg et al. (2003) used neuroimaging to examine the cerebral responses of three Franciscan nuns practicing Centering Prayer. Blood flow increased in the hypothesized neural regions (e.g., prefrontal cortex), thereby shedding light on the physiological mechanisms of change in Centering Prayer.

Approaching the topic from a psychosocial angle, Johnson et al. (2009) conducted a pilot descriptive and correlational study on the impact of mood, spiritual well-being, and quality of life amongst female patients ($n = 10$) practicing Centering Prayer while undergoing chemotherapy treatment. They conducted three sessions on Centering Prayer over the course of nine weeks. Post-treatment standardized scores of anxiety, vigor, depression, anger, social well-being, and faith all shifted in expected directions by a half standard deviation. Although the sample size was not adequate for parametric testing, the positive changes from center prayer treatment provided preliminary, albeit limited, support for investigating outcomes of Centering Prayer. Ferguson et al. (2010) conducted a preliminary study with an intervention group ($n = 15$) and a comparison group ($n = 15$). In the intervention group, the participants practiced Centering Prayer twice day for 11 weeks along with another contemplative practices (for example, walking meditation and chants). They measured changes in anxiety and communication styles with God during this daily practice. The diversity in communication styles increased with statistical significance in the prayer group but not the comparison group. Changes on anxiety scores were not statistically significant in either group.

These preliminary studies highlighted that the literature could benefit from additional extensive research. Fox et al. (2015) conducted a qualitative content analysis on the lived experiences of Centering Prayer practitioners ($n = 20$). They categorized five aspects of Centering Prayer, including the Divine, the Mystical, Spiritual Development, Action-

Contemplation, and Contemplative life. Overall, the findings indicate that Centering Prayer substantially alters the manner in which practitioners relate to themselves, others, and God. Subsequently, Fox et al. (2016) performed a quantitative pilot study on individuals ($n = 22$) who participated in two Centering Prayer workshops. The goal was to measure the various effects on the mental health and religious constructs on which participants completed assessments at the beginning and end of the study. Over the course of three weeks, participants attended a weekly workshop that taught Centering Prayer. Between the first and final assessments, anxiety ($p = .012$, partial $\eta^2 = .27$), stress ($p < .001$, partial $\eta^2 = .65$), spiritual transcendence ($p < .001$, partial $\eta^2 = .91$), and faith development ($p < .01$, partial $\eta^2 = .57$) changed in the expected directions with statistical significance and large effect sizes. Religious crisis shifted in the unexpected direction by significantly increasing with a large effect ($p < .001$, partial $\eta^2 = .81$). Subsequent research is largely qualitative (Blaschke, 2017; Hughes, 2018; Rhodes, 2018). Underscoring a general theme, these qualitative findings highlight a path from Centering Prayer to a shift in consciousness, which results in a deeper connection with God. Nevertheless, the generalizability of the study is limited due to sample size and the lack of a control group (Fox et al., 2016). Fox et al. recommend further research into this topic using experimental design, which is a component of this study.

Theoretical Frameworks of Stress and Emotion

Resilience, as the primary focus of this study, encapsulates one of the many responses of the human spirit to adversity (Garmezy, 1974; Masten, 2006). In addition, considering the existing research on the relationship between meditation and stress, the study is largely concerned with the response of the mind and body to stress. Consequently, this section is devoted to a) reviewing the prevalent stress theories in the literature and b) expanding on the

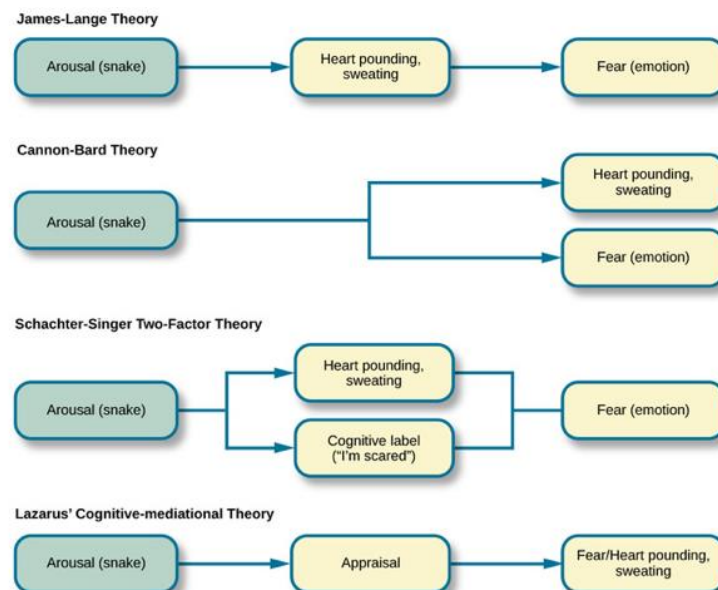
guiding theoretical framework of this study, which comprises the seminal Transactional Model of Stress and Coping Theory (Lazarus & Folkman, 1984). Subsequently, I elaborate on the neurochemical processes associated with stress and coping followed by the broaden-and-build theory from the positive psychology movement.

Early Theories of Stress and Emotion

Since the nineteenth century, psychologists have gained increasing awareness about how arousal, emotion, physiology, and behavior tie together to explain the manner in which people respond and adapt to challenges in their environments. Although meditation gurus and monks have highlighted the positive physical effects of meditation throughout history, the empirical evidence of meditation is rooted in stress theory from the nineteenth century. Physiologists sought to understand how the body copes, and they led research to the protective effects of meditation over time. Figure 2 presents a diagram of some select early theories of stress.

Figure 2

Diagram of Early Theoretical Frameworks of Stress, as cited in Lumen Learning (2020)



James–Lange Theory

This theory first appeared in the literature in 1884, and it is one of the earliest models that associate emotion and physiological response to stimuli. This theory eventually came to be known as the James–Lange Theory (Coleman & Snari, 2011). In his groundbreaking work *What Is an Emotion* in 1884, William James introduced the idea that emotions result from preceding physiological responses. For instance, a person's heart rate increases due to a sudden noise. Subsequently, the mind perceives that the person feels frightened. In a calm environment, cortisol levels decrease and the breathing rate steadies, thereby indicating that the emotion the person feels is calmness. The physiology-dependent schema of emotion remained dominant in the early psychology literature for decades until several psychologists, including Walter Cannon (1927), addressed the framework's limitations. Although it received criticism for being reductionistic in the later years, it was a seminal theory in tying physiological and emotional responses together (Coleman & Snari, 2011).

Cannon–Bard Theory

Walter Cannon (1927) developed the Cannon–Bard theory to directly challenge the James–Lange theory (Cannon, 1927). The Cannon–Bard theory states that emotional and physiological responses occur in tandem. The work of Cannon (1915) was instrumental in stress research because of his publications on the topic of acute stress or the *fight-or-flight* response. This seminal work jumpstarted research on human adaptation to stressors. Although his work focused on static physiological responses, it influenced the work of Hans Selye, who researched longitudinal adaptation to response—this comprises early research on resilience.

Selye's General Adaption Syndrome

The medical concept of stress taxing the human mind began in the 1930s with the research of Hans Selye, who is referred to as the father of stress theory (Selye, 1956; Tan & Yip, 2018). At the time of his research, acute stress or the body's fight-or-flight response was already present in the literature due to Cannon's research in 1915. Selye expanded the research on how the body adapts to demands beyond the initial reaction and developed research on *general adaptation to chronic stress*. He borrowed the term "stress" from the discipline of physics, which describes a material resisting pressure, to the effect that he was the first one to use the term "stress" in 1950 when describing the physiological response to emotional demands, which he called *stressors* (Selye, 1950). Subsequently, it was operationalized for the social sciences when describing it as the body's response to the multitude of demands in life. Selye, through his research on stress, describes the physiological aspects of resilience through his famous *general adaptation syndrome*. In his research, he describes the body's capacity to resist the demands of life and maintain homeostasis and also discusses its possibility of succumbing to exhaustion. Stress theory describes a balance between resistance and exhaustion to the challenges faced by humans from the onset of stress research. With its beginnings in medical research, operational definition stress comprised an event experienced by a human being. It would undergo different behavioral definitions when psychologists would take his research and build some of the modern stress theories used by researchers today.

Resource-based Theories of Stress

Resource-based theories of stress generally consist of more recent models and contest the appraisal approach to stress (Hobfoll, 2001). From the standpoint of this framework, human beings require a certain level of resources (for example, personal strengths and environmental conditions) to cope with potential stressors. Resource theories do not disregard the fact appraisal

is a critical part of the cognitive system when it comes to experiencing resilience. However, when perceived from the lens of this paradigm, a person's resources, as opposed to their cognitive appraisal, determine how they adapt to challenges. The forerunner model in this framework is Conservation of Resources theory (COR; Hobfoll, 2001)—one of the leading modern theories of stress. Under the COR lens, human beings behave in diverse ways to conserve resources that protect them against potential stressors. It consists of the following two major principles: a) Primacy of Resource Loss and b) Resource Investment. Primacy of Resource Loss describes how the benefits of resources decrease on the margin. In other words, losing a resource affects a person more than gaining a resource. Resource Investment alludes to the human penchant to consistently invest in resources even though they may not need more at the present moment. It is an instinct to save resources in case of an unlikely loss.

Appraisal-based Theories of Stress

Appraisal theory largely advanced due to the work of Magna Arnold, who added a cognitive element to stress theory in the 1960s (Cornelius, 2006). Instead of using a stimulus as the determining factor of stress response, Arnold expanded the idea that *cognitive appraisal* activates the sequence of emotions that humans feel in response to stress. In other words, emotions (for example, fear, relief, and anger) and multiple physical responses (for example, relaxation and shortness of breath) depend on a person's appraisal or interpretation of a demand. Psychologists continued to adapt her work and build appraisal theories, but the flagship model was ultimately Lazarus and Folkman's Transactional Model of Stress and Coping Theory (1984). It forms the theoretical framework behind numerous empirical studies that associate meditation with increased positive psychological outcomes (Ai et al., 2009; Dezutter, Wachholtz, &

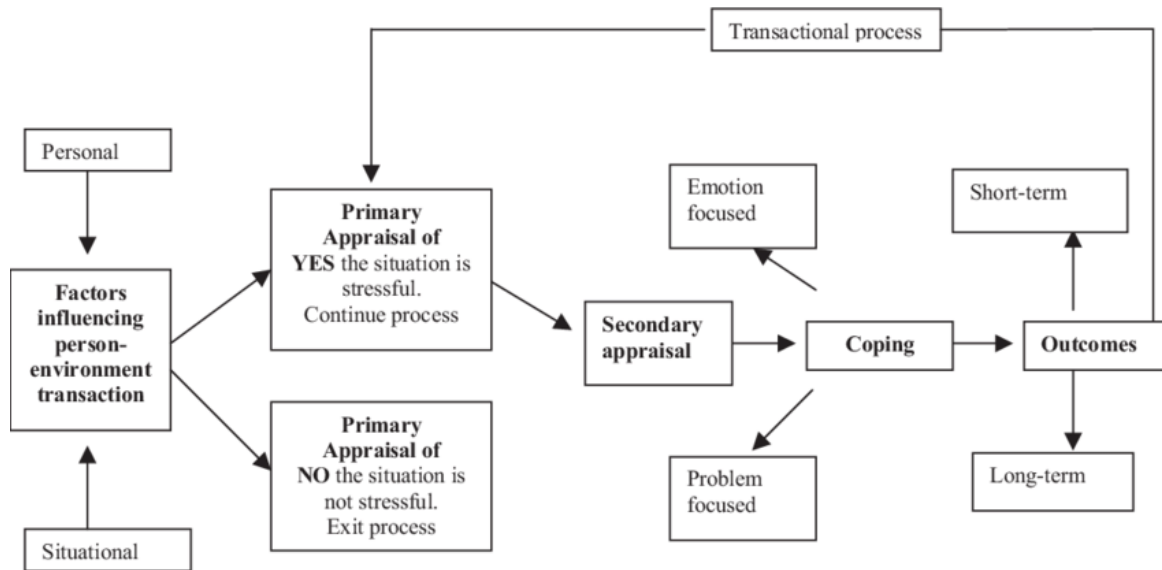
Corveleyn, 2011; Gutierrez, Conley, & Young, 2016). It is also the framework that provides the theoretical basis of this study.

Transactional Theory of Stress and Coping

This proposed study draws on the Transactional Model of Stress and Coping Theory (Lazarus & Folkman, 1984) to examine how a centering contemplative practice leads to resilience. Like other appraisal theories, the Transactional Model of Stress and Coping Theory explains that outcomes of stress hinge on the *cognitive appraisal* of a potential stressor during transactions with the environment (Lazarus & Folkman, 1984). Specifically, stress was the outcome of a dynamic transaction between a person's appraisal of stressors and their coping skills. Lazarus (1991) expanded the appraisal theory and built a *cognitive-mediational model*. It follows the direct path between stimulus (demand) and emotional response, but it places cognitive appraisal as a *mediating* variable. Furthermore, it also supports a related model named Mindfulness-to-Meaning Theory (Garland et al., 2015), which describes how meditation can cultivate a space to cognitively reappraise and foster more positive outcomes. Figure 3 presents a diagram of the Transactional Model of Stress and Coping Theory.

Figure 3

Lazarus and Folkman's (1984) Transactional Model of Stress and Coping Theory, as cited in Schuster et al. (2006)



Cognitive appraisal has two levels in Transactional Model of Stress and Coping Theory. In the first appraisal, an individual determines whether a situation is threatening or not. If one perceives it as a threat, then the individual determines a coping mechanism to respond to the event, which is the second appraisal. During the second appraisal, the individual chooses between two types of coping taxonomies, namely Problem-Focused Coping (PFC) and Emotion-Focused Coping (EFC). While these coping mechanisms can be favorable, they can also be considered unfavorable or unresolved (for example, hypervigilance and panic attacks). Positive coping mechanisms render positive emotions, whereas unresolved responses cause more stress for the individual. This back-and-forth exchange of coping mechanisms and stress depict the basis of the theory, which is *transaction*. It is important to note that Folkman and Lazarus (1984)

do not label coping mechanism types as healthy and consider the others as maladaptive. The adaptiveness of the coping mechanism entirely depends on how and for what reason the individual executes it.

Problem-Focused Coping

Generally, PFC corresponds to healthy responses in the literature (Biggs, Brough, & Drummond, 2017). Research generally depicts an individual assertively taking agency of a problem, and the research findings generally associate this act with positive clinical outcomes. To illustrate this point let us take the example of a trauma survivor, who would most likely suffer from intrusive thoughts—the source of great stress to individuals with post-traumatic stress disorder (PTSD; American Psychiatric Association, 2013). A potential PFC strategy to manage the stressor would involve calling a counselor or leaving a high-stress work environment that act as a stimulus to these intrusive thoughts. In this strategy, people control the areas of their lives that they are able to control in order to reduce the stressors in their lives. However, in some cases, the person has no control over the stressor, such as the trauma that is associated with the death of a loved one. In these cases, a person has little choice but to engage in EFC mechanisms.

Emotion-Focused Coping

EFC manages the emotions that a stressor leaves with a person. It can relate to maladaptive coping mechanisms, such as denial or extended psychological avoidance, even though it comprises coping mechanisms that are not maladaptive (Biggs, Brough, & Drummond, 2017). To reintroduce the example of struggling with intrusive thoughts, a maladaptive EFC would involve forcing oneself to feel happier feelings, which is a form of avoidance. A positive EFC strategy to manage negative emotions could comprise engagement in a contemplative

practice, such mindfulness meditation. In this strategy, the individual manages the emotions by allowing the negative thoughts to brew in the mind without trying to control them assertively.

Physiological Stress Response Systems

While Lazarus and Folkman describe a theoretical mechanism of change in which cognitive reappraisal can foster positive outcomes, it is important to recognize the underlying physiological mechanisms at hand. These processes describe the physical components that occur during cognitive appraisal and, thus, potentially affect contemplative practice. Cognitive appraisal reduces stress by playing a key role in a neurochemical process known as *allostasis*—the body’s initial reaction to perceived demands and its return to homeostasis (Sterling & Eyer, 1988). This response system also characterizes physical components of resilience, which comprise a construct of interest in the proposed study. In regulated allostasis, the body can appropriately match environmental demands but later stabilize to its previous relaxed state (Sterling & Eyer, 1988). Take into consideration the fight-or-flight responses to a perceived attack. After the body perceives a demand as threatening or challenging, the sympathetic nervous system responds to the demand with increased catabolic processes (for example, cortisol release, increased heart rate; Epel et al., 1998). After the stressor has passed, the parasympathetic nervous system increases anabolic processes (for example, growth hormones) to return to homeostasis (Sterling & Eyer, 1988; Epel et al., 1998).

Epel et al. (1998) expanded Sterling and Eyer’s research to examine the key role played by cognitive appraisal in allostasis, which supports Lazarus and Folkman’s (1984) stress theory. According to Epel’s research, the type of stressor does not necessarily determine the physical stress response but rather the person’s cognitive appraisal of the same (Epel et al., 1998). For instance, an individual could face a demand such as public speaking, and perceive it as

threatening. Cortisol spikes, tensed muscles, and dysregulation of gastrointestinal processes are common symptoms. However, the individual could also reappraise the same demand as a positive challenge and physically re-stabilize, thereby terminating catabolic processes and initiating anabolic processes. To a degree, the connection between demands and physiological effects (for example, muscle tension and gastrointestinal pain) depends on how the individual makes sense of the demand (Epel et al., 1998).

Allostasis is not always a regulated process for many individuals. For instance, the termination of catabolic processes tends to be dysregulated for individuals who suffer from severe psychological distress, such as in the form of PTSD (Ozbay et al., 2007). After undergoing long-term stress, the body may remain in a chronic state of catabolic processes known as *allostatic load*. Allostatic load can lead to physically harmful outcomes (for example, hypertension, heart failure, and compromised immune systems) as well as other forms of psychological distress (for example, depression and anxiety; McEwen, 2004). Mood disorders correspond to prolonged releases of cortisol. Chronic unbalanced activity from the hippocampus is associated with a clinical anxiety—the most frequent diagnosis amongst college students (Bamber & Morpeth, 2019; McEwen, 2004). Thus, therapeutic interventions, which can reduce allostatic load and promote successful allostasis load, are relevant to the counseling field, and the research highlights how they can help individuals positively shift cognitive appraisal—from interpreting a demand as an out-of-control threat to a challenge that they can overcome.

Positive Psychology

Diverging from a tradition of focusing on pathology and mental illness, positive psychology is a discipline that focuses on positive experiences, traits, and emotions, which add meaning and purpose to human life, which can be referred to as thriving or flourishing

(Seligman, 2011). Moreover, the research within positive psychology examines how to foster this kind of thriving in human life. It is important to note that positive psychology does not comprise the singular focus on the positives and abstinence from stress, adversity, or suffering. Instead, it comprises a focus on the positives in the face of pain as two independent psychological processes (Duckworth, Steen, & Seligman, 2005). It is possible to explore the dynamic relationship between the positives and the painful from this standpoint. I built this study of how hope bolsters resilience to stress based on this foundation.

Emotion and Adaptation

Lazarus and Folkman's Transactional Model of Stress and Coping Theory provides an understanding that humans can either appraise or choose from a range of coping mechanisms in response to stressors. Their selection of coping mechanisms determines the outcomes of their stress response. At this juncture, emotion can play a key role in stress response. Research historically focuses on emotion as either a desired treatment outcome or a predictor of well-being (Fredrickson, 2001). Researchers examine interventions that reduce negative influence and bolster positive impact. Observation and empirical research clearly demonstrate that positive emotion is a signpost of positive clinical functioning. Moreover, Lazarus (1991) argued that the coping mechanism chosen by people reflects their emotion at the time, when referring to *specific action tendencies* (Fredrickson, 1998). Specific action tendencies indicate the concept that a person's emotions can influence the body's reaction to stress and its selection of coping mechanisms (Fredrickson, 1998). In other words, emotion influences appraisal. In reference to specific action tendencies, negative emotions (for example, fear) narrow the options of coping mechanisms from which a person can choose. Consider the binary fight-or-flight reaction

triggered by fear. In this fearful emotional state, people perceive less possibilities with respect to the ways in which one can react. They perceive fewer pathways to overcome a challenge.

Broaden-and-Build Theory

Positive emotions can potentially have a reverse impact on the range of coping mechanisms that people can appraise (Fredrickson, 1998). According to Fredrickson's research and broaden-and-build theory, positive emotions broaden a person's *thought-action repertoire*. It allows them to perceive a wider range of coping mechanisms at their disposal. In other words, positive emotion bolsters positive cognitive appraisal. For instance, Chang and DeSimone (2001) found that hope has a positive influence on secondary appraisal—the appraisal in which a person chooses the preferred type of coping response to stress. This study provided evidence for the earliest theories of hope, which contended that appraisal and coping mechanisms depended on hope (Craig & Edwards, 1983; Lazarus, 1966; Stotland, 1969).

Spiritual Principles

Amongst several pursuits, positive psychology examines the spiritual principles that strengthen and give sustenance to humans (for example, hope, courage, and transcendence; Templeton, 2002). As the science of the human spirit, positive psychology operationalizes and examines spiritual principles and subjects them to scientific scrutiny by examining the dynamic roles played by them in human psychology. The research is important, as it provides evidence in favor of the early theories on meditation. For instance, Benson theorized that spiritual principles enhanced the physiological and psychological *relaxation response* to meditation—a phenomenon he named the *faith factor* (Benson, 1985, 2013; Benson & Stark, 1996). His theory was consistent with the findings of Wachholtz and Pargament's (2005) work that spiritual meditation produced more positive outcomes than general meditation. The distinction between spiritual and

non-denominational mediations is ambiguous even with this finding, as both tend to increase spiritual outcomes amongst practitioners (Carmody et al., 2008). Due to the interwoven nature of meditation and spiritual principles, the exploration of the relationship between spiritual meditation, resilience, and hope has been accomplished in this proposed study.

Overview of Resilience

The history of research on resilience has proceeded in stages that researchers have classified into four different waves (Masten, 2006; Richardson, 2012). The chronology describes a timeline and the point where the proposed study fits as well as implications for future research. The study of resilience, as a psychosocial construct, began with phenomenological research within developmental psychology in the 1970s, largely through research conducted by Garmezy (1974; Masten, 2006; Richardson, 2016). During this generation, psychological research heavily focused on pathology or negative outcomes to stress and trauma. The early pioneers of resilience (e.g., Garmezy, Rutter, and Werner) had each begun conducting research studies on stress, but eventually they became more interested in the recovery or adaptation of high-risk children. They quickly identified that it was not that certain children possessed a special trait that helped them adapt to their stressful circumstances, but rather research highlighted an underlying process of stress adaptation. The early pioneers of resilience were interested in the reason behind why certain children from vulnerable populations, in general, and those with economic disadvantages, in particular, adapted and even succeeded economically, psychologically, and relationally instead of succumbing to adverse conditions. The result of the first wave of research was a thick description of resilience for future research, which included positive qualities of humanity, such as hope, autonomy, and faith (Richardson, 2016; Seligman, 2011).

With the aim of examining a foundation of a construct, the successors of Garmezy's research began the second wave of research, which entailed examining *protective factors* of resilience. Protective factors are explanatory variables of stress adaptation, such as social support, genetics, faith, or economic advantages. During this time, theories began to be developed, describing resilience as a dynamic process. Researchers rejected the idea of resilience as a fixed trait but rather described it as a dynamic, multi-causal model. Researchers stressed the importance of individual differences and stability of resilience over time (Werner & Smith, 2001).

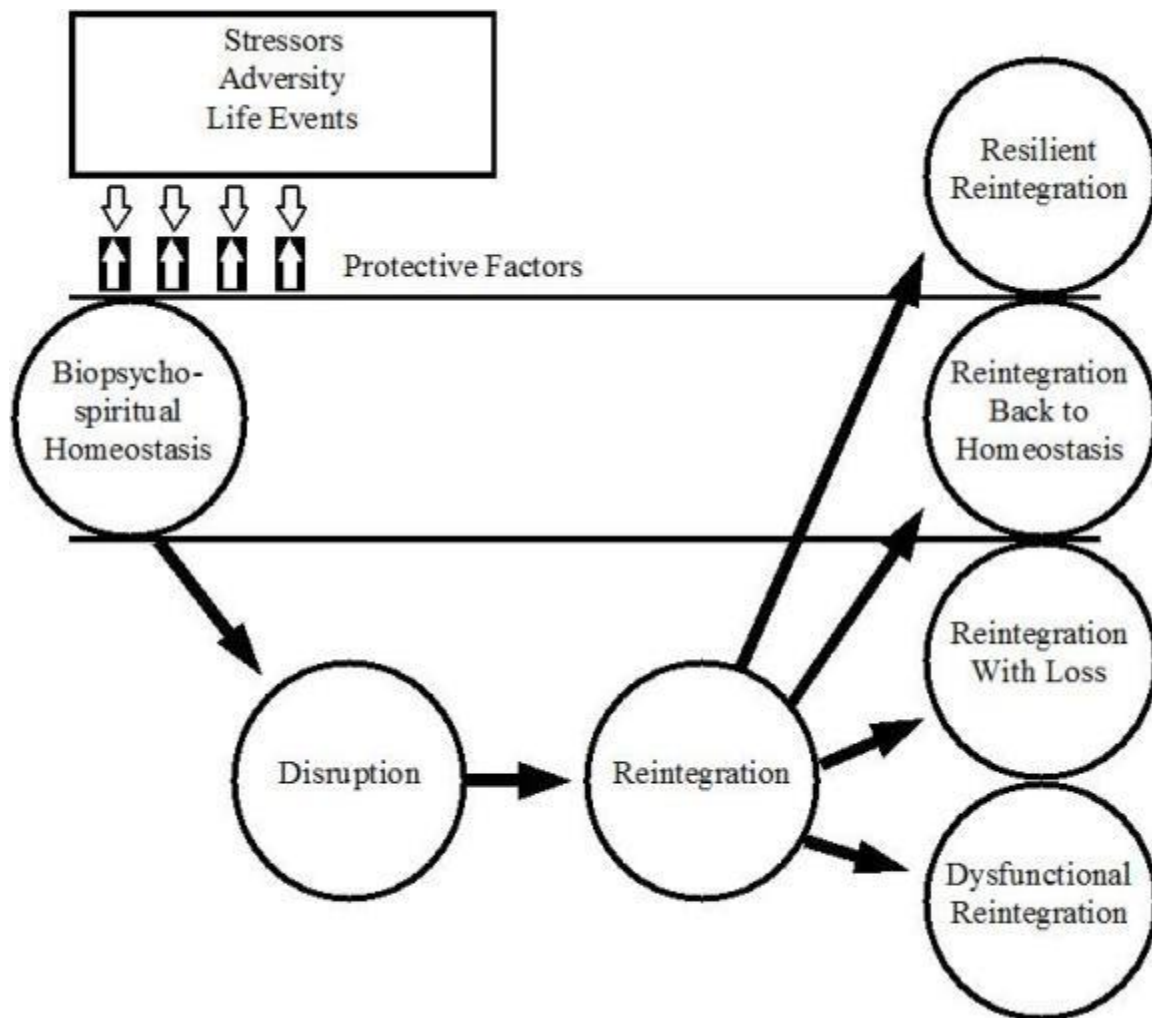
Once a comprehensive list of protective factors was established, the focus of research turned to experimental, outcome studies of interventions for bolstering resilience (Masten, 2006). The overall finding was that resilience is teachable. Interventions can facilitate the dynamic processes underlying resilience. The fourth and current wave of research pertains to the analysis of the dynamics of resilience of models as a part of experimental studies (Masten, 2011). The fourth wave comprises a multidisciplinary effort to holistically examine resilience.

Theoretical Framework

I primarily leaned on Glenn Richardson's (2002) model of resilience amongst the many definitions of resilience available in the literature. Figure 4 presents a diagram of the model of resilience.

Figure 4

Model from Metatheory of Resilience and Resiliency (Richardson, 2002)



Ecobiopsychospiritual Homeostasis

Based on the foundation of MRR (Richardson, 2002), individuals navigate different events to maintain ecobiopsychospiritual homeostasis. The latter, in turn, rests in the balance between protective factors and environmental stressors. In homeostasis, which Richardson labels as the *comfort zone*, individuals may experience adverse life events, but their protective factors can adaptively return them to equilibrium. A person has found a sense of normalcy in their environment, including place of work, home, and other social situations, from an ecological perspective. Biologically, a person has adapted to their physical state. Although no one enjoys perfect health, they have adapted to maintaining their physical state with a sense of balance.

Psychological homeostasis is sometimes referred to as intellectual homeostasis. It implies that a person has achieved a level of intellectual ability to adapt to the tasks in their environments (for example, academic studies and job duties). Lastly, spiritual homeostasis reflects that a person is at ease with their beliefs, spiritual experiences, and walk of faith.

Reintegration

An individual cannot perpetually remain in homeostasis. At some point, either a stressor or challenge will unsettle equilibrium. The disruption may come in the form of an adverse event, such as a death, job loss, or a personal mistake. However, positive opportunities (for example, employment promotions and new relationships) can challenge a person to grow and disrupt equilibrium as well. Richardson describes the departure from homeostasis as *venturing*. It can describe individuals embracing an exciting opportunity to grow, dealing with an unexpected event that is thrust into their lives, or making a decision outside their moral code. Any kind of venturing causes a *disruption* in homeostasis. Because of the disruption, individuals will respond with four types of reintegration. In the most optimal scenario, a person will respond with *resilient reintegration*—a way of thriving amidst adversity. They will accumulate new protective factors and increase their level of homeostasis, thereby reflecting greater resilience than before. *Homeostatic reintegration* describes a return to the same level of resilience as before. *Reintegration with loss* indicates that a person has either lost protective factors or the increased stressors have considerably sustained so that homeostasis remains lower than before. In *dysfunctional reintegration*, a person resorts to problematic coping mechanisms (for example, substance use and disordered eating) to maintain homeostasis. Although these levels are specific to Richardson's model, they reflect the consensus in the literature that resilience is dynamic. Individuals are perpetually navigating an inner balance not only to avoid dysfunctional coping

but also to find greater levels of resilience and thriving. The option of resilient reintegration reflects the basis of positive psychology and that of this proposed study.

Meditation and Resilience

During the recent decades, empirical evidence has continually supported the connection between resilience and meditation. Researchers have aimed to develop a number of studies that measure outcomes of resilience from the viewpoint of meditation (Waechter & Wekerle, 2015), but they generally infer resilience by measuring indirect variables, such as stress adaptation, compassion, or various mental health measures. Based on a comprehensive and detailed review of the literature from Waechter and Wekerle (2015), the research on the direct connection between resilience and meditation is observed to be very much in its early stages. Although it is a burgeoning research topic, the fields of clinical psychology and neuroscience research have been quick to combine forces and provide a scientific foundation for future research. Kwak et al. (2019) examined the dynamic neural changes of resilience due to a four-day intensive meditation intervention by leveraging a sample of Korean adults ($n = 47$). One group of participants ($n = 30$) participated in meditation (MED), whereas a control group ($n = 17$) participated in a relaxation intervention. The researchers measured outcomes through mindfulness and resilience measures as well as fMRI measures. Over the course of one year, they measured these outcomes at the following three points in time: before treatment (T_0), post-treatment (T_1), and during a three-month follow up (T_2). Subsequently, they analyzed the interaction between time and intervention groups through an ANOVA test. Although participants in both groups showed significant increases at T_1 , the meditation group showed sustained outcomes at T_2 , (MED group: $t = -3.57, p < 0.005$, and $t = -2.91, p < 0.001$, respectively; control group: $t = -0.96, p = 0.35$, and $t = -1.000, p = 0.33$, respectively). However, study's limitations include the fact that

the meditation group participated in two more sessions than the relaxation control group—a finding that threatens the internal validity of the study.

Another body of current research focuses on the relationship between resilience and overall mindfulness, as opposed to the practice of meditation. As per the operational definition of mindfulness, it is the attention given to both inner and outer experiences without judgment (Shapiro et al., 2008). Mindfulness is a Buddhist practice that fosters a heightened awareness of one's surroundings (Sedlmeier et al., 2012). Although it can be defined as a state of detached awareness, mindfulness should not be confused with a wandering mind. A wandering mind loses the focus of the here-and-now and places it on whatever thought enters the mind (Killingsworth & Gilbert, 2010). In the literature, it often appears as a variable in both meditation and resilience studies. For instance, Keye and Pidgeon (2013) examined this relationship by performing regression analysis amongst a sample ($n = 141$) of college students. In this sample, mindfulness scores significantly predicted resilience, $B = 42.73$, $R^2 = .44$, $p < .000$. In other words, mindfulness accounted for nearly half of the variance in resilience scores. This was a cross-sectional study and did not examine the dynamic relationship longitudinally. Many of these studies incorporate longitudinal treatments, such as MBSR, which were presented earlier in the chapter.

Hope

Various disciplines examine hope from different angles, depending on the context and culture. For instance, many world religions define hope as a type of spiritual virtue (Burke, 2012b) that helps shape people's actions and goals to align with their senses of purpose and meaning. The field of healthcare perceives it as a protective agent in healthy recovery from illness (Stephenson, 1991). In general, there is consensus in the literature that it is an instinctive

human need and response that allows people to surmount adversity and find meaning in life (Stephenson, 1991). Consequently, the field of positive psychology has lent numerous research studies to examining its role in people's lives.

Hope in Positive Psychology

The positive psychology movement contends that forces such as hope not only protect one against psychological distress but also allow people to flourish in life. (Arnau et al., 2007; Seligman, 2011). The next several decades of research have witnessed a wide range of empirical studies linking hope to positive clinical outcomes ever since the emergence of Snyder's Hope Theory (Arnau et al., 2007). For instance, Gutierrez, Dorais, and Goshorn (2020) found that hope has a partial mediating effect on the relationship between recovery progress in substance use and risk of relapse. In addition, Dorais and Gutierrez (in progress) found that hope mediates the impact of mindfulness on resilience in a community sample. Yoon et al. (2018) examined the relationship among hope, academic performance, and student engagement in the college population. Through structural equation modeling, they found that hope significantly predicts student engagement ($\beta = .377, p < .001$), academic performance ($\beta = .078, p < .05$), and vocational identity ($\beta = .407, p < .001$). Overall, these studies demonstrate the wide range of outcomes that can be influenced by hope.

Early Psychosocial Models

In the field of psychology, the scholarship on hope began in the 1950s and operationalized hope as a motivational or a *goal-oriented* force (Cantril, 1964; Farber, 1968; Frank, 1975; Frankl, 1992; Melges & Bowlby, 1969; Menninger, 1959; Schachtel, 1959, Stotland, 1969; Snyder et al., 2002). In this context, goals can be defined as the "human ambition to alter one's condition to match one's hopes" (McNeill & McNeill, 2003, p. 1). It assumes that

human beings are inherently driven by goals and the desire to accomplish these goals. They function optimally when they move toward them and function maladaptively when they avoid them. Beyond a goal-oriented approach to hope, early psychologists such as Stotland (1969) and Menninger (1959) described hope as a *mindset* more than an emotion. A person could feel emotions attributed to hope such as confidence, peace, and motivation. However, these emotions followed a determined state of mind—a belief that one could reach their goals. To further clarify this point, it can be said that the psychosocial construct of hope did not comprise a belief that good things will happen to a person by deviating from faith or optimism. Instead, it comprised the belief that one can make good things happen for themselves. Hope is faith with self-efficacy or optimism with motivation from a behavioral lens. In 1969, Ezra Stotland gathered a number of studies that associated hope with reduced psychological distress (for example, anxiety and depression) and created a motivational model of hope as a unidimensional psychosocial construct about goal attainment. In this motivational model, hope was prominent for several decades until Snyder et al. began exploring the cognitive aspect of hope.

Cognitive-Motivational Model

Snyder (2002) worked off of the pre-existing motivational model of hope and theorized on a cognitive facet of hope by building the most widely accepted framework Hope Theory. As he researched the goal-directed thought processes surrounding hope, he noticed that individuals were not just motivated about their goals. In addition to feeling motivated, many goal-driven individuals could also confidently contrive *pathways* to reach their goals. They would describe how they would reach their goals despite facing potential obstacles. They were confident they could generate one formulaic plan even if they could not describe a plan to reach a goal. In other words, the term “hope” can still be used to describe the motivation to overcome a challenge, such

as attending college or recovering from addiction. However, hope is not completely activated until a person believes they can formulate a plan to enroll in the fall or check into treatment. Snyder et al. (2002), from this early finding, formally developed a cognitive-motivational model with two divisions of hope that focus on a) generating goals and b) finding ways to achieve these goals. They describe *willpower* (“I can do it”) and *waypower* (“I can find a way”). Snyder titled them as *agency* and *pathways*—the two necessary approaches of hope to attain goals.

Agency

Agency describes the original motivational model of hope. It is based off of the assumption that human beings a) possess a certain degree of autonomy and b) desire to accomplish goals. A key to well-being is activating both conditions, a state that Snyder named agency, from a positive psychology standpoint. It describes an intrinsic motivation that expresses, “I have what it takes.” However, hope is not in complete form if a person believes they cannot find a way to reach their goal. Individuals could have goals to strengthen a marriage, overcome obsessive compulsive disorder, or build a business. Fueled by intrinsic motivation, they believe they possess the agency to reach this goal if a path is available. The final facet of the model is the belief that they can cognitively contrive a path.

Pathways

While a goal is often future-oriented, a pathway connects the present to the future. When describing his new addition of pathways to the original motivational model, Snyder stated, “the concept of time and how we are journeying through this continuum are necessary and useful to human thought” (Snyder, 2002, p. 251). Herein, he was alluding to the concept that humans are grounded in a time-oriented mindset. Goals are mental representations of a future that they want to experience. However, if the future is unknown, then the path to attaining goals is never fixed.

Cognitively contriving a path to a goal requires dynamic cognition and being responsive to ever-changing obstacles. A person could contrive a plausible path to purchasing a home, but a potential stressor in the environment, such as job loss, could result in altered plans. Thus, Snyder's concept of pathways consists of both confidence and cognitive ability to continuously find a way through the unknown to meet a future goal.

General Research from Hope Theory

Ever since Snyder introduced his cognitive-motivational model, researchers have been using it to frame a number of empirical studies ranging from creativity (Rego et al., 2009) to chronic muscular pain (Bartley et al., 2019). In addition, Snyder et al. developed assessments that measure both dispositional hope (1992) and states of hope (1996), which are prevalent in research methods. Under the Snyder's theoretical framework and assessments, the literature presents a trend of hope moderating and mediating various psychosocial outcomes, including resilience, (Dorais et al, in progress), creativity (Rego et al., 2014), depression (Kwok & Gu, 2019), adolescent suicidal ideation ($\beta = -0.11, p < .01$; Kwok & Gu, 2019), adolescent prosocial behavior (Padilla-Walker, Hardy, & Christensen, 2011), general mental health (Shorey et al., 2003), and cognitive appraisal (Chang & DeSimone, 2001). The correlation of hope with both resilience and cognitive appraisal is particularly pertinent to this study. These previous findings provide a basis to examine the influence of hope on the trajectory resilience.

Dynamics of Goal Attainment

A goal is an objective that requires a series of behaviors or mental processes to be executed in order to attain the aforementioned goal under Snyder's paradigm (Snyder, 2002). If goals are a driving force in human nature, then they are consequently complex and multi-dimensional. They can be measurable such as losing 20 pounds or meeting a monthly sales

quota. However, they can also be vague mental representations of self or situation, such as a desire to have more purpose in life. In addition, goals are often dynamic. A person can reach a one-time goal such as graduating high school. However, for other types of goal attainment, a person must sustain, increase, deter, or delay certain outcomes. Thus, hope is an unending current that flows through the human condition. According to Snyder's theory, as long as a person maintains their ability to think, they maintain their ability to hope. Like any state of mind, it is prone to frequent change and the influence of other mental processes and intervention. Because of this nature, I aimed to examine the dynamics of hope in relation to Centering Prayer.

Hope and Meditation

While constructing Hope Theory, Snyder (1994) firmly believed meditation and prayer could fortify one's sense of hope. He contended that a calm mind was requisite to cognitively configuring pathways to goals. In other words, a ruminating mind cannot see or appraise the potential paths that lie before it (Chang & DeSimone, 2001). In his *Psychology of Hope*, he stated: "The praying (or meditating) person shuts off the draining processes associated with attending to various daily stressors...prayer or prayerlike mental activities thus provide a day-by-day renewal that is important when people return to the rigors of coping" (Snyder, 1994, p. 62).

Studies informing Snyder's research indicated that hope and prayer were often interwoven. For instance, they are two of the most commonly used coping methods in chronically ill patients (Baldree, Murphy, & Powers, 1982; Jalowiec & Powers, 1981). Researchers have explored various facets of the relationship between hope and meditation since his theory has been popularized. Operating off of Snyder's framework, Munoz et al. (2018) demonstrated that mindfulness meditation increased hope and decreased stress in a quasi-experimental design with a non-clinical population. Thornton et al. (2014) created a treatment

method named Hope Therapy based on Snyder's paradigm and used mindfulness techniques to treat psychological distress amongst women with cancer recurrence. The study was not an experimental design, but repeated measures associated positive effects with mindfulness and Hope Therapy.

While many studies demonstrate how hope and meditation coincide, it is important to note the order of influence. Jon Kabat-Zinn (2012) believed that mindfulness preceded hope. Similar to Snyder, he contended that individuals cannot hope for a better future if they cannot embrace the present. A mediation model was suggested in the same direction as described by Kabat-Zinn, and it indicated that hope mediates the impact of mindfulness on resilience as opposed to the other way around (Dorais et al., in progress). Therefore, an intervention that integrates mindfulness, such as meditation, is a strong selection for promoting hope and resilience.

Hope and Resilience

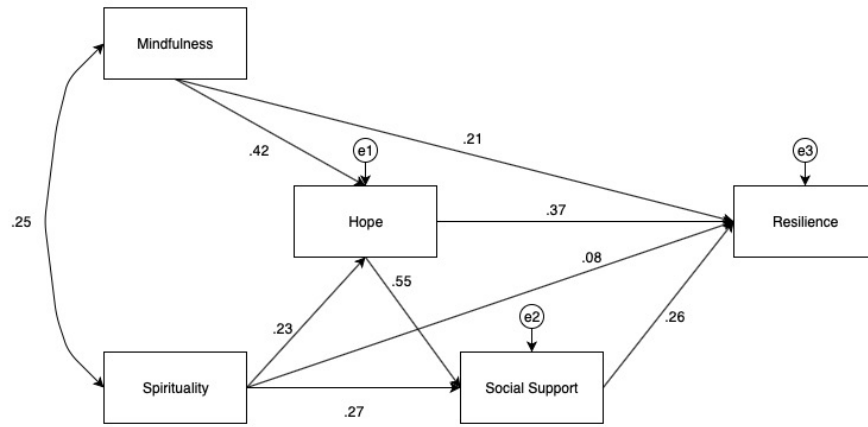
The connection between hope and resilience has garnered more empirical attention in the recent years. In a sample of adolescent women, Kirmani et al. (2015) found a statistically significant correlation between hope and resilience, $r = .39, p < .01$. The following year, Ong, Edwards, and Bergeman (2006) conducted a preliminary investigation on the dynamic relationship among hope, mood, and resilience. They created a time series on this data, which comprised a 45-day collection, and conducted multi-level random coefficient modeling analyses. In addition, they indirectly measured resilience through changes in stress levels. With a non-clinical sample ($n = 27$), Ong et al. found that hope moderates the impact of stress and negative mood over the span of 45 days ($\gamma_{11} = -.262, t = -3.84, p < .001$). As a limitation of the study, the researchers did not use a psychometrically validated assessment of stress. Instead, they asked

participants to consider the most stressful event of the day and rate their level of stress from one to five on a daily basis. Furthermore, they did not measure the construct of resilience through a specific assessment.

With a sample of undergraduate students ($n = 332$), Satici (2016) designed a structural equation model (SEM) to test the mediating effects of hope on the relationship between resilience and subjective well-being. After demonstrating acceptable fit, the SEM model revealed a significant relationship of resilience on hope ($\beta = .38; p < .01$). The standardized correlation coefficient indicates that hope increases by slightly over one-third of a standard deviation when resilience increases by one standard deviation (Preacher & Kelley, 2011). Satici measured hope through the Dispositional Hope Scale (DHS; Snyder et al., 1991), as this was a cross-sectional study measuring traits of hope. As I designed a longitudinal study that measures varying states of hope over time, I used the State Hope Scale (SHS; Snyder et al., 1996), which Ong et al. (2006) utilized in their longitudinal study. In addition, a recently conducted pilot study (Dorais et al., Unpublished Manuscript) indicates that hope mediates the relationship between mindfulness and resilience. The fit indices of the mediation model indicated a good fit with the data, $\chi^2 (1, N = 391) = 1.86, p = .172$, RMSEA = 0.05, CFI = .99, and TLI = .99 (Schermele-Engel, Moosbrugger, & Müller, 2003). On the top half of the model in Figure 5, mindfulness and hope have a standardized total effect of .37 on resilience. This total effect is a sum of the direct effect of mindfulness on resilience ($\beta = .21; p < .001$) and the indirect effect of mindfulness on resilience through hope ($\beta = .16; p < .001$). This finding, along with related studies, offer a basis to further longitudinally examine the dynamic relationship between hope and resilience.

Figure 5

A Mediation Model of Mindfulness, Hope, Resilience, Social Support, and Spirituality



Spiritual Transcendence and Resilience

The literature also presents spiritual transcendence as a potential determinant of resilience (Walsh, 2020). In light of the events that have transpired during the COVID-19 pandemic, Walsh (2020) describes the resilience people have cultivated to overcome the stresses of human loss, unemployment, and social isolation. She uses a of transcendence that states it is “to rise above suffering and hardship through larger values, spiritual beliefs and practices, and experiencing transformations in new priorities, a sense of purpose, and deeper bonds” (Walsh, 2020, p. 905).

Longitudinal studies on the trajectories of spiritual transcendence show levels can fluctuate in face of hardship (Eriksson et al., 2014). In a sample of humanitarian workers, Eriksson et al. (2014) conducted a latent class growth analysis (LCGA) to identify different groups of participants based on their trajectories of spiritual transcendence. The time frame of data collection was based on deployment, which generally consists of high levels of stress. Their findings supported evidence for spiritual transcendence as a non-linear system. Similar to their

study, I seek to examine the non-linear relationship between spiritual transcendence and resilience.

Stress and Resilience in the College Population

According to the literature, meditation is an intervention that is available to a wide number of populations, including college students (Forbes et al., 2018; Greeson et al., 2014; Ospina et al., 2008; Sedlmeier et al., 2012). The literature presents a relationship between meditation and a number of positive clinical outcomes (Opsina et al., 2008). However, the research on the connection between meditation and resilience is still in its infancy (Waechter & Wekerle, 2015). Resilience is a major component of thriving (Seligman, 2011). Therefore, it is challenging to determine a target sample that could benefit most critically from the research. However, the state of college counseling before and especially during the COVID-19 pandemic has led us to begin our research with the college population.

Stress in the College Population

Students in higher education inevitably face a high degree of stress (Hartley, 2010; Im, Greenlaw, & Lee, 2018; Read et al., 2011). Stress is a leading cause of health issues, and risk factors for college students include but are not limited to financial debt, prevalence of substance use, and academic rigor. As stress levels continue to increase, college students are more likely to engage in substance use, lower the standards of their academic performance, or withdraw from school. Specifically, stress is highly associated with clinical anxiety, which predicts decreased academic performance and attrition (Bamber & Morpeth, 2018). In a recent national health assessment, one in five college students reported experiences of suffering in the academic context due to anxiety (American College of Health Association, 2015).

Mental Health Resources in College Counseling

College counselors attempt to alleviate the stress of students through counseling resources, but they do not have the capacity to meet the needs of the entire college population (Iarussi & Shaw, 2016). Students often remain on waiting lists to visit their college counselors or receive referrals to off-campus mental health resources. However, these options are limited for a large number of students who do not have a mode of transportation or adequate health insurance at their disposal. Thus, the field of college counseling has announced a state of crisis in terms of the limited mental health resources available to students (Xiao et al., 2017). College counselors seek interventions that can reach a large number of students. In addition, during COVID-19 pandemic, due to the natural increase of online college programs, counselors need mental health resources that are distributable on online platforms. Consequently, meditation is becoming a growing resource on college campuses (Forbes, Gutierrez, & Johnson, 2018; Greeson et al., 2014). Not only can in-person trainings can address large groups, but online guided meditation trainings are also a practical effective option. In a recent study, Huberty et al. (2019) conducted a randomized controlled trial on a sample of college students experiencing high stress ($n = 88$). They measured high stress with a cut-off score of 14 on the Perceived Stress Scale (PSS; Cohen et al., 1994). The intervention group meditated for ten minutes a day with the Calm app for eight weeks. After eight weeks, the meditation group exhibited a statistical decrease in stress in comparison to the control group with a large effect size ($\nabla = -7.13$; $p < .001$; $d = 1.24$). As it is difficult to eradicate many of the risk factors for college students (for example, academic rigor and prevalence of substance use), facilitating a means to meet stressors with resilience has gained increasing importance (Vidic & Cherup, 2019). This study aims to extend the literature on how to bolster resilience in college students during a time of critical need.

Conclusion

This chapter presents a literature review on the intervention of Centering Prayer, the college population, theoretical constructs, theoretical frameworks, and supporting empirical and theoretical literature. Specifically, it underscores the literature that supports the relationship among hope, resilience, and Centering Prayer. I presented a rationale to examine the dynamic relationship among hope, resilience, and Centering Prayer through an in-depth elaboration of their supporting theories and empirical research. Furthermore, I presented how it fits as an alternative solution to the stress experienced by the college population and the college counseling field.

CHAPTER THREE: METHODOLOGY

In Chapter Three, I introduce the research methodology for this longitudinal experimental research study regarding the effects of centering prayer on resilience. This study consists of two primary aims: 1) to determine the effectiveness of centering prayer on increasing resilience and 2) to examine the temporal dynamics of resilience during a centering meditation intervention. I discuss the applicability of a longitudinal approach, experimental research design, and the various statistical analyses we utilize in the study. Specifically, this chapter includes a brief introduction of temporal dynamics, specifically on the use of Growth Curve Modeling and Time Series Analysis. Further, I present the participants, procedures, and instrumentation of the study. This chapter begins with a description of the contemplative intervention and the research questions, followed by an expansion of the methodology.

Centering Prayer

Centering is a category of contemplative practice that promotes stillness, refocusing wandering modes of consciousness to the breath, an idea, or a sacred word (Keating, 2002). It is a spiritually oriented meditation that stems from the mystical practice of *contemplative prayer*. As an intervention, centering prayer is a meditation that associates to increased mindfulness and spiritual transcendence as well as reduced stress (Fox et al., 2016). To practice centering prayer as the intervention in this study, participants followed instructions based off of Keating's guidelines to centering prayer (2002; 2009).

1. Select a word or symbol you consider to be spiritually grounding for you (e.g., a name for God, or spiritual concepts like Shalom, hope, or joy), and represents your intention to connect with what is spiritual to you.

2. At the beginning of the meditation, sit down comfortably with your eyes closed (preferably away from external distractions) and silently introduce your sacred word or symbol.
3. After you do this, you'll probably notice distracting thoughts emerging or mind wandering. That's okay. When you notice yourself becoming distracted, just ever-so-gently reintroduce your sacred word or symbol.
4. At the end of your meditation, just sit and rest in silence or say a prayer for a few moments.

Participants received instructions and practice the meditation individually. After each morning and evening meditation, participants recorded their states of hope (as measured by the State Hope Scale; Snyder et al., 1996). At three timepoints, they responded to a battery of assessments that measured the constructs in the research questions below.

Research Questions

1. Is there a significant difference in levels of resilience (as measured by the Response to Stressful Events Scale [RSES; Johnson et al., 2011]) between individuals who participate in a daily meditation and a comparison group?
2. In both the IG and CG, will the autocorrelative patterns of hope (as measured by the SHS) fluctuate as a state, remain stationary as a trait/disposition over time, or exhibit an increasing trend (measured through an ARIMA time series model)?
3. What is the trajectory of resilience when accounting for hope (as measured by the State Hope Scale [SHS; Snyder et al., 1996]) as an explanatory variable and mediating variable?

4. As an exploratory question, what are the roles of mindfulness (as measured by the Cognitive and Affective Mindfulness Scale – Revised [CAMS-R; Feldman et al., 2007]), spiritual transcendence (as measured by the Spiritual Transcendence Scale [STS; Piedmont et al., 1999]), and stress (as measured by the Perceived Stress Scale [PSS, Cohen]) in the trajectory of resilience over time?

Research Hypothesis One

There will be a significant difference in resilience (as measured by the RSES) between a group of individuals who participate in a daily meditation and individuals from the comparison group.

Research Hypothesis Two

The fluctuations of hope (as measured by the SHS) will be nonstationary in the control group and will stabilize and increase in the meditation group.

Research Hypothesis Three

Hope (as measured by the SHS) will serve as a significant time-varying covariate and within-subject mediator of resilience over time.

Exploratory Research Question

There will be a significant correlation between centering prayer and the constructs of mindfulness, spiritual transcendence, and stress.

Rationale

As the primary aim in the study, I tested the effectiveness of a centering meditation on increasing resilience (in response to the first research question). Subsequently, I investigated the effect of the meditation on the temporal dynamics of resilience in response to the other research questions. The first goal falls under the category of *nomothetic* research, which uses aggregate

data to ask *why* a change takes place (Schmidt, Perels, & Schmitz, 2015). In this study, I asked why one group of participants become more resilient over time compared to the other group. I used an experimental research design to test the hypothesis that centering prayer causes an increase resilience.

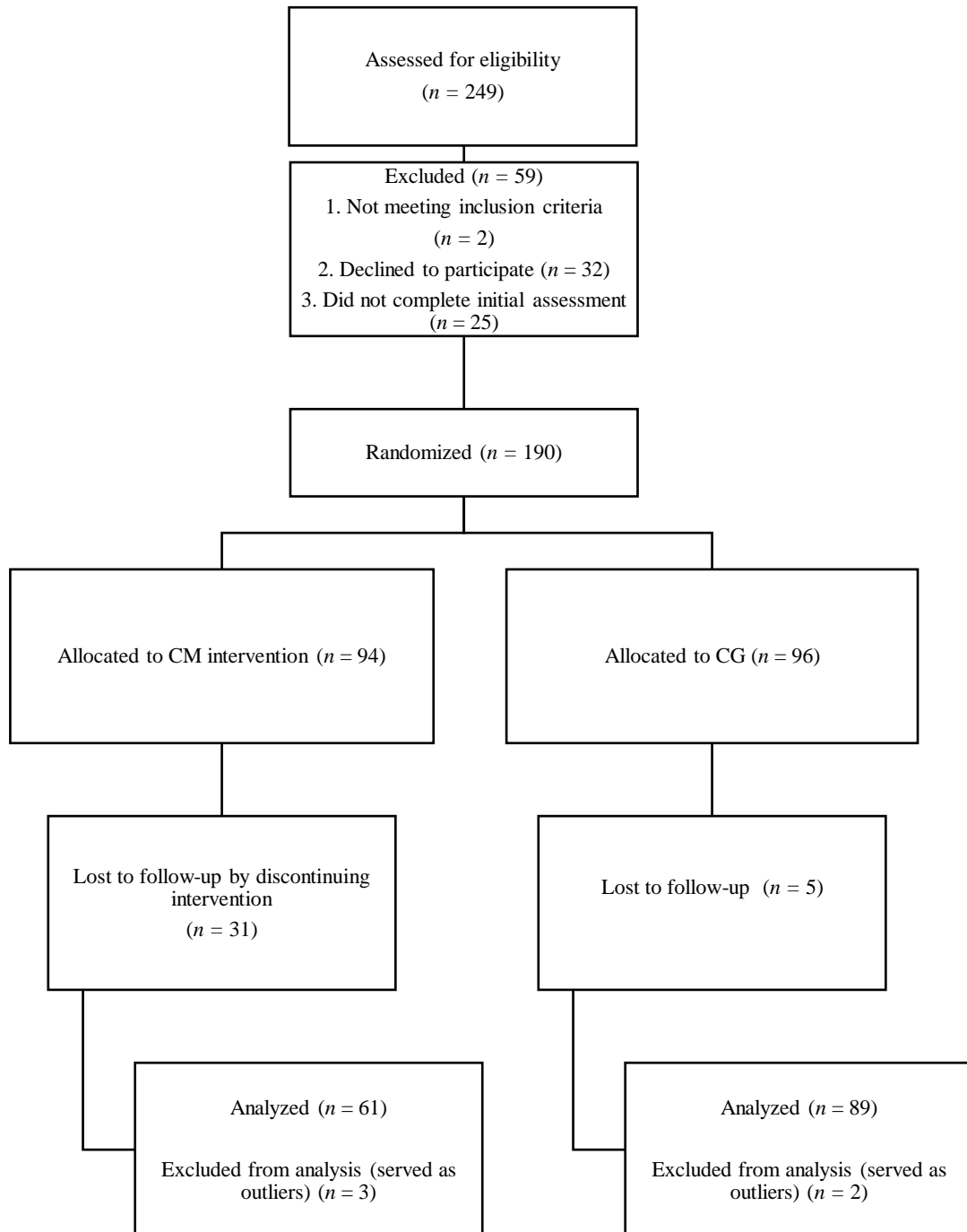
In outcome research, after determining the efficacy of an intervention, a subsequent question asks *how* the intervention was effective (Fortes et al., 2005; Petriks & Cronin, 2014). Deviating from the nomothetic approach, exploring how individuals arrive at a given outcome benefits from a quantitative *idiographic* approach (Schmidt et al., 2015). Idiographic research measures differences at an individual or aggregate level. These individual differences can highlight how certain variables lead to specific outcomes. In longitudinal research, the study of *temporal dynamics* is a robust idiographic approach because it measures individual differences within patterns, trajectories, fluctuations of psychosocial constructs over time (Kuppens & Verduyn, 2017). This research design incorporates statistical analyses used in temporal dynamics such as Time Series Analysis and Growth Curve Analysis. A following section will elaborate on the use of each one in response to their respective research questions.

Experimental Research Design

As the first research question indicates, this study examines the potentially causal effect of centering prayer on resilience. Thus, I designed an experiment research design to determine causal inference. In any experiment, the central component is manipulating one variable of the study to identify any change in outcome compared to leaving this variable alone (Shadish et al., 2002). I included the treatment of a centering meditation to measure the outcomes of resilience and its potential covariate hope over the course of time. As indicated by Figure 6, I selected to use an RCT in order to generate the most robust form of evidence for the findings.

Figure 6

Participant CONSORT flow diagram through the study. CM = centering meditation. CG = comparison group.



Random Allocation

A key protocol in generating unbiased trial results is randomized allocation (Suresh, 2011). Conducting a parallel-design RCT, I randomly assigned eligible participants to either the intervention group or comparison group. A randomized generator via Qualtrics created a randomization schedule and sorted participants into each group with equal probability. Randomization decreases the likelihood of biases that could potentially threaten the validity of the study including selection bias and accidental bias (Kirk, 1994; Suresh, 2011). Confounding variables are inevitable in any study, but randomized allocation sorts confounding variables to each group with equal likelihood.

Covariate adaptive randomization. An equal number of participants entered each group, which ran a minor risk of creating another covariate in the study because differences could form in each group. Although these potential differences can be accounted for and interpreted in the data analysis period (Suresh, 2011), I employed a *covariate adaptive randomization* technique to reduce the likelihood of groups forming covariates. Covariate adaptive randomization is a stratified randomization approach but for studies that permit a rolling enrollment of participants. Before recruitment, I identified several demographic characteristics that could serve as a covariate such as academic level (e.g., undergraduate, graduate), program of study (e.g., general studies, clinical mental health counseling, or institution (e.g., faith-based institution, public university). In a stratified sampling method, participants are randomly assigned to groups while controlling for their covariates so that one group does not house all participants with one characteristic. To employ a pure stratified sampling method, researchers must assign all participants at the onset of the study. For an enrollment period that allows for

multiple waves of group assignment, researchers can use the covariate adaptive randomization method to randomly stratify participants to groups at different points in time.

Blinding and allocation concealment. I used a blinding approach in this study, indicating that neither the participants nor researchers knew whether participants were in the treatment or comparison group. The goal of this method is to reduce observer bias, detection bias, and recall bias (Sedgwick, 2015). Upon enrollment in the study, participants were immediately assigned a randomized ID, and all information for follow-up contact were separated from it. An external, protected file connected the randomized ID to any further information about the participant.

Conduct. Since this study was a home-based clinical trial, participants did not participate in the intervention at a designated site. As an online study, participants completed surveys and participated in the meditation intervention at the places of their choosing. Monitoring adherence to study procedures has potential limitations in home-based trials (Argent, Daly, & Caulfield, 2018). To monitor adherence, Qualtrics sent participants reminders with links to complete questionnaires at specified times. Completing the brief morning or evening assessment served as verification of adherence.

Intention-to-Treat Analysis

In a longitudinal RCT, participants may often provide incomplete data or fail to comply at all times in the study (Gupta, 2011). Attrition of this kind can create “overoptimistic estimates of the efficacy of an intervention” because compliance can suggest a type of motivation which is a potentially confounding variable (Gupta, 2011, p. 110). One method of generating an unbiased effect of the intervention is Intention-to-Treat (ITT) analysis. Part of the analysis is using the last recorded observation throughout the rest of the analysis (Gupta, 2011). Adhering to Consolidated

Standards of Reporting Trials (CONSORT) guidelines in this study, I aimed to report on all participants who do not follow through with the intervention. With ITT, I still analyzed the data from participants who dropped out. Thus, all participants who dropped out are still included the analysis. However, this refers to participants who confirmed they completed at least some part of the treatment beyond the baseline point ($n = 155$).

Temporal Dynamics

In behavioral science, temporal dynamics is the study of how thoughts, emotion, and behavior change patterns and trajectories over the course of time (Fortes et al., 2005; Kuppens & Verduyn, 2017). Behavior that was once predictable can become erratic. With clinical treatment, dysregulated emotion can stabilize. When a positive area in someone's life grows, other strengths tend to increase alongside it. The research area of temporal dynamics consists of multivariate statistical analyses that can estimate these fluctuations and their effects on other outcomes (Fortes et al., 2005). A primary aim of this study is to analyze the dynamic and interdependent relationship among meditation, resilience, and hope. Previous research has indicated that contemplative practices generally produce a positive effect on resilience (Loizzo, 2018). However, much has yet to be understood about how contemplation influences the trajectory and patterns of resilience.

In designing a study on dynamics, it is necessary to consider the *principle of contingency*, which states that human conditions like resilience depend on or respond to other variables (Kuppens & Verduyn, 2017). To determine the trajectory of resilience, it is important to consider with what it associates. Related literature shows a general correlation between hope and resilience (Beck & Socha, 2015; Li et al., 2016). In addition, Dorais et al. (Unpublished Manuscript) previously determined that hope has a significant mediating effect on resilience and

mindfulness. Thus, operating off of the principle of contingency, we will examine the temporal dynamics of hope and resilience in relation to meditation.

Hope as an Explanatory Variable

In this study, I examined if hope can partially explain how meditation increases resilience over time. A key to explaining changes in psychosocial dynamics is by identifying patterns of behavior (Vallacher, Read, & Nowak, 2002). To identify any pattern, one must examine fluctuation and variability broken out by individuals. Tests like ANOVAs and t-tests rely on the central tendency of participants' measurement scores (i.e., mean scores, standard deviations of one group), thus cancelling out the individual fluctuations (intra-individual differences) over time. Examining intra-individual differences over time belongs to analyses such as Growth Curve Modeling (Curran et al., 2010). Growth Curve Modeling measures the different trajectories of change among individuals and allows researchers to extract patterns among these trajectories through time-varying covariates. In response to the third research question, I hypothesized that hope serves as a significant time-varying covariate of resilience and mediator of the effects of time on resilience.

Trait Hope Versus State Hope

Hope can function differently over time from person to person, which are considered individual differences. Hope can function like a *state*, fluctuating day to day like any other state of mind (Snyder et al., 1996). A person can begin a day feeling hopeful about their life, goals, and capability. However, it is not uncommon for this state of mind to change as the day continues. Furthermore, one's state of hope can fluctuate with no predictable pattern. Mathematically, this type of instability describes a *stochastic process*—random, pattern-less variations with non-significant autocorrelation from one timepoint to the next. On the other hand,

some individuals exhibit stable patterns of hope as if it were a personality trait. Snyder (2002) operationalizes this trait-like function as dispositional hope, which exhibits *inertia* over time. Observations from variables with high inertia can still vary from day to day, but they will regress to a predictable level over time (Ninot, Fortes, & Delignières, 2005). Statistically speaking, hope as a trait would demonstrate significant autocorrelation from one time point to another, highlighting a steady and predictable forecast of hope in the future.

The second research question asks whether or not hope functions like a state or a trait under the influence of meditation. I arrived at this question for our study due to several reasons. First, Hope Theory and other literature continually provide evidence that hope can act like both a state and a trait (Snyder et al., 2002). Further, if hope is a significant covariate of resilience, as our second hypothesis suggests, individuals could experience greater and more stable levels of resilience if they experience stable patterns of hope. Thus, I examined if meditation causes fluctuating states of hope to stabilize into trait-like patterns of hope. This also informs the second research question, which asks whether or not hope functions like a state or a trait under the influence of meditation. I used an ARIMA model from Time Series Analysis to estimate the changes in patterns of hope between a meditation group and comparison group (Fortes et al., 2005).

Threats to Validity in Longitudinal Research

Internal Validity

Before beginning any study, it is important consider any issues that would render the study findings invalid (Shadish et al., 2002). In a research design concerned with causal inferences, a study would have strong internal validity if other variables could not likely cause the measured outcome (Shadish et al., 2002). In our study, the internal validity weakens if

resilience increases for reasons other than centering prayer. Naturally resilience responds to a number of events, so we attempt to design a study that eliminates other alternatives as much as possible.

Threats to internal validity relevant to this study include history, maturation, and attrition. *History* refers to the events that took place during the study. During the course of this study, individuals experienced global events such as shut-down and reopening phases due to COVID-19. They also experienced personal events impossible to account for, which could influence their levels of resilience. *Maturation* describes the natural changes that take place in individuals as they grow over time. Although the study consists of four weeks, any longitudinal study must account for maturation in individuals. Another threat critical to longitudinal research is *attrition*, which is the drop-out of participants before the study ends. To lower these threats, I randomly assigned half the participants to a comparison group, which Shadish and colleagues (2002) recommend for increasing internal validity. It is likely that many external variables other than meditation will influence resilience, but they will also influence the resilience among the comparison group. Further, if individuals naturally grow in resilience over time, the same growth should be apparent in the comparison group. Thus, I can attribute any significant differences in resilience to the intervention, lowering the threats of history and maturation respectively. Unfortunately, random assignment will not reduce the threat of attrition. Thus, I relied on compensatory initiatives to keep retention high throughout the study (Teague et al., 2018).

External Validity

External validity concerns whether research findings of will extend beyond the parameters of the study and into other relevant populations (Shadish et al., 2002). For instance, population validity concerns whether or not the sample is generalizable to the population. For

instance, I administered this study online, requiring all eligible participants to have daily access to the internet, which already describes only one part of the population. In addition, even if this study could reach people without internet, this is a completely voluntary study. Participants responded likely if they had interest in the study and/or want to receive compensation. Shadish et al. (2002) describes this problem as the *interaction of causal relationship with units*. In other words, this study could have attracted a sample of individuals who are responding because they depend on the compensation or are already invested in contemplative practice. To reduce this threat of external validity, I recruited from a wide range of universities and included a question regarding interest in meditation in the demographics section.

Procedure

Sample Size Determination

I considered the parameters of proposed analysis when determining the adequate sample size for the study. Large sample sizes of up to 100 participants are preferable for growth curve models although models have fit data with one fifth of that sample size (Curran et al., 2010). I aimed to oversample twice that which the power analysis indicates, estimating an attrition rate of 50%. In time series analysis, the sample size can refer to the number of time points rather than the number of participants. Researchers often use TSA for analyzing the data from an actual population that changes from timepoint to timepoint (e.g., students in a semester). Since I used an experimental design, I ensured that the sample included participants who remain in the study from beginning to end. The main concern was to select an adequate number of time points. Tabachnick and Fidell (2018) recommend a time series of approximately 50 timepoints. Thus, I selected using a time span of four weeks with measurements recorded twice a day.

Participants

I submitted the study to the Institutional Review Board (IRB) at William & Mary before recruiting participants. Upon receiving approval, I contacted various universities (e.g., community colleges, universities, online schools) to recruit our target population of college students. Inclusion criteria consisted of adults who were enrolled at least part time in an undergraduate or graduate program. Table 1 presents a detailed list of the demographic information of participants.

Data Collection

As a recruitment approach, I used convenience sampling, which is a nonprobability sampling method that targets one or more specific groups within a population (Shadish et al., 2002). With a list of previously established contacts in place, I initially contacted professors or organizational leaders through e-mail to formally disseminate information about the study. With allowance to contact students, I distributed information of the study through e-mail and listservs. The information included the purpose, time frame, requirements, compensation of the study, and a web link to the study. Upon clicking the link, respondents were redirected to an Informed Consent and screener to determine if they met the inclusion criteria. Upon providing informed consent and passing the screener, participants were officially enrolled in the study. They received information of how to continue the study through Qualtrics. They were able to terminate participation in the study at any given time. The information provided did include any identifying information beyond their e-mail address.

Random Assignment

The purpose of random assignment in experimental designs is to lessen the likelihood of confounding variables producing the measured outcomes of the study (Shadish et al., 2002). As I used a covariate adaptive randomization technique, I initially determined any potential

identifying characteristics that could serve as a covariate if grouped with similar participants (e.g., field of study, age bracket) and stratify participants accordingly. After passing the screener, individuals automatically received a randomization code through a computer generator, randomly assigning them to either an intervention group or comparison group.

Measurement Procedure

Participants enrolled in study completed three measurement procedures: a) one-time demographics questionnaire, b) a bi-daily brief hope assessment, and c) an assessment battery at three points in time. Each assessment was available through a link to Qualtrics, which emailed them the assessments to participants at predesignated times. Once participants enrolled in the study, they completed a demographics survey followed by an initial assessment battery. They subsequently received a battery of assessments that measured resilience, stress, spiritual transcendence, and mindfulness. Qualtrics resent this assessment battery again at the mid-point and final point of the study. If participants did not respond to an assessment, Qualtrics sent an e-mail reminder to complete the survey with a new link. Lastly, participants also received a link to a brief assessment of hope every morning and evening for the entirety of the study, culminating to a total 56 administrations of four weeks.

Over a four-week period, each participant received an email reminder to meditate in the morning at 6 am and in the evening at 6 pm. After meditating, they completed a brief online assessment of hope via Qualtrics. At the same windows of time, participants in the control group received the same brief assessments of hope without the reminder to meditate. After downloading the data from Qualtrics, I uploaded them to both SAS software and Statistical Package for the Social Sciences (SPSS) Version 26. I used Statistical Analysis Systems (SAS)

PROC MIXED to analyze growth models and answer the first, third, and exploratory research questions. I used SPSS Expert Modeler to answer the second research question.

Growth Curve Model

I employed a Growth Curve Model (GCM) to address the first, third, and fourth research questions. GCM measures the trajectory of how a variable develops over the course of a time (Curran & Muthen, 1999). Therefore, it determines the treatment outcome (in response to the first research question) and the development of the outcome (in response to the third research question). It can estimate this development through measuring individual differences over time (Curran et al., 2010). Further, researchers can introduce potential explanatory variables that account for these individual differences. In this study, I used GCM to a) measure differences in outcomes of resilience between the treatment group and control group, b) examine how hope influences the trajectory of change in the treatment and control group, and lastly c) address the exploratory question of how resilience changes over time based on mindfulness, stress, and spiritual transcendence

Although latent growth curve analysis is a popular method, I utilized mixed modeling to estimate the growth curve model (McNeish & Matta, 2017). I used a two-level model in which the participants themselves serve as the level-2 units. The time of assessment (i.e., Time 1, Time 2, Time 3) serve as level-one units, which are nested within each participant. With this model, I can examine the variance between participants (level 2) as well as within a participant over time (level one). I chose this model because my research hypotheses depend on each participant in the treatment group changing over time (intra-individual variance), and this dynamic would hypothetically differ significantly from the participants in the control group (inter-individual variance). In this analysis, the outcome variable is the resilience of participants, as measured by

their scores on the RSES. I explore the variances through explanatory variables such as hope, mindfulness, spiritual transcendence, and stress. I used PROC MIXED on SAS to estimate the fixed and random effects in each mixed model.

Fixed Effects

In a traditional linear model, the model estimates the parameters of explanatory variables that are fixed or constant. No matter how much an independent variable (e.g., time) changes, the model estimates that it has a fixed effect on the outcome y , mathematically described through a coefficient β .

$$y = \beta_0 + \beta_1 \text{Group} + \beta_2 \text{Time} + \beta_3 \text{X*Time} + \varepsilon \quad (3.1)$$

The general linear equation above still accounts for random effects through the error term ε .

However, it assumes the random effects are untraceable and uninfluential (i.e. independence and identical distribution of residuals), which is why researchers refers to it as *white noise*. The fixed effect model shows the overall trend of treatment from the explanatory variable. In other words, it measures the average effect that group (treatment or comparison) and time have on resilience and, thus, answers a large part of my first research question. However, to increase accuracy of the model, I estimate the outcome by analyzing the random effects in the model.

Random Effects

In longitudinal clinical trials, variance from one participant's outcomes in one timepoint to the next (intra-individual variance; Hoffman, 2015) is likely. Theoretically, the variances are considered 'random' because each individual changes in a unique way. However, it is still possible to model these variances through parameters called *random effects*. To estimate random effects, a mixed model does not use a fixed value coefficient like β . Rather, it uses a covariance

matrix Z to estimate the influence of random effects on an outcome. The covariance matrix fits a latent trajectory line similar to a regression line based on the residuals.

$$y = \beta_0 + \beta_1 X + \beta_2 \text{Time} + \beta_3 X * \text{Time} + Z\text{Time} + \varepsilon \quad (3.2)$$

Unconditional Growth Model

Before a designing a growth curve model for the research questions, the recommended research design calls for an unconditional growth model, which measures the growth of resilience based on time alone as a fixed effect (Singer & Willett, 2003). Equation 4.3 below is the example of a

$$y_{ti} = \beta_{00} + U_{0i} + (\beta_{10} + U_{1i})\text{Time}_{ti} + \varepsilon_{ti} \quad (3.3)$$

In the equation above, the figure t represents the three assessment days (i.e. initial assessment, midpoint follow-up, final assessment), and i represents each participant (i.e., participant 1, 2, 3...150). The figure y_{ti} represents the estimated average resilience score at the t^{th} timepoint for the i^{th} participant. U_{0i} is the *random intercept* and represents the difference between the participant i 's intercept and the estimated population intercept β_{00} . Next, β_{10} represents the slope (change in resilience from one timepoint to the next) from the 150 participants. U_{1i} represents the difference between participant i 's slope and the population slope. The U figures are important because the model depends the variances (τ) of these figures, which are known as *between-individual variance*. In a mixed model, ε_{ti} represents the *within-individual random error*. In other words, it is the difference between the observed resilience score at time t and the estimated resilience score for each i participants. The equation must include ε_{ti} because it will indicate if observed scores of individuals are changing (or growing) over time as a random effect. After conducting an unconditional growth model, I can compare its result to models with other explanatory variables (e.g., treatment group, hope) of the trajectory of resilience.

Time Series Analysis

To answer the second research question, I used Time Series Analysis to examine the stability of hope over time and its relationship with centering prayer. Time series analysis functions like a microscope to the “processes that underlie the evolution of observed behavior” (Fortes et al., 2005, p. 222). For many years, researchers have stressed the importance of researching the stability of psychosocial constructs, and time series analysis is a robust and recommended methodology in behavioral research (Fortes et al., 2005). To measure stability, researchers need data and a statistical procedure that work with large reiterations of observations through which they can estimate patterns of stability. If observations of behavior are recorded repeatedly at equal intervals of time (e.g., hourly, daily, weekly), the resulting dataset is called a *time series* (Shadish et al., 2002). Time series analysis extracts trends, estimates stability, and forecasts observations through detecting patterns in the string of repeated observations. For the purposes of this study, I used time series analysis to estimate the temporal stability of hope between two groups of participants: a) participants practicing meditation daily and b) participants not practicing meditation. In addition, I also forecasted future observations in hope in both groups through a specific time series analysis called ARIMA modeling. Time series analysis is an established statistical method for answering questions about the temporal stability of constructs (Ninot et al., 2005).

Based on the literature, hope can function like a state (varies in degree over time) or a trait (remains stable over time). A time series can display how it functions like both a trait and state. The up and down movement of hope (as measured by the SHS) displays the *state-like* behavior of hope. Hope rises and falls like someone’s mood rises and falls. However, it tends to regress to a certain baseline or follow a trend over a time. In other words, no matter how much hope varies daily, a time series can highlight a larger, “big-picture” view of its baseline over

time. A stationary baseline indicates *no positive or negative trends* over time. A trend line on a graph would show a flat, horizontal line. A positive trend would show that hope moves daily but it tends to increase over time. A positive trend line on a graph would show a slanting line that points northeast. A positive trend would indicate that trait hope has shifted. The baseline of hope has actually increased over time.

ARIMA Model

Time series analysis includes a number of models to analyze time series data, but ARIMA modeling is generally the more applicable and preferred model of forecasting future observation based on a model built by past data patterns (Box & Jenkins, 1976; Salkind, 2012), a well-established method of forecasting future observation based on a model built by past data patterns (Salkind, 2015). In this study, I use bi-daily hope levels to extract trends and potentially forecast future hope levels. Short for Autoregressive Integrated Moving Average, ARIMA modeling predicts future outcomes based on the patterns of lags. ARIMA identifies each repeated interval in the time series as lag 1, lag 2... lag k . To find predictive patterns, the ARIMA model relies on three parameters (p, d, q). $AR(p)$ measures *autocorrelation*, the correlation between a value and a past observation of itself. The d parameter refers to *differencing*, a method of removing trends so the data can be stationarity for analysis. $MA(q)$ stands for *moving averages*. The ARIMA model combines an autoregression and moving average regression to create a sophisticated model of predicting future observations.

Autoregressive Model. The Greek word *autos* means *self*, and an autoregressive equation regresses a variable against itself from the past. The correlation between a value and its past observation (lag) renders an autocorrelation coefficient similar to a Pearson's correlation

coefficient. In the autoregressive model, autocorrelation coefficients and lags as predictor variables. A written expression of an autoregressive model is below.

$$x_t = \phi_1 x_{t-1} + \phi_2 x_{t-2} + \dots + \phi_p x_{t-p} + \varepsilon_t \quad (3.4)$$

Moving Average Model. When a regression predicts any outcome, it always includes the error—a figure representing the unknown factors of an outcome that are either undiscovered or statistical insignificant in the sample. A time series model will include the error of the autoregressive equation at each timepoint. Oftentimes, the predictive model will be off from the observed value in a similar way each time. An ARIMA model uses that pattern to increase the accuracy of its prediction by including a moving averages model. The moving averages MA(q) model, uses error terms from lags as predictor variables. A written expression of a moving average model is below.

$$x_t = z_t + \theta_1 z_{t-1} + \theta_2 z_{t-2} \dots + \theta_q z_{t-q}, \quad (3.5)$$

Measures

Demographics Questionnaire

In order to collect basic demographic information along with history of contemplative practice, I designed a brief demographics questionnaire administered at the onset of the study. Participants self-reported on the gender, race, age, religion, and spirituality. In addition, the survey asked questions related to history of contemplative practice. Items included content related to: a) degree of familiarity (e.g., somewhat familiar, very familiar), b) history of practice (e.g., months, years), c) type of practice (e.g., mindfulness meditation, yoga, contemplative prayer, moving meditation), and d) frequency of practice (e.g., minutes a day, days a week). That

way, I could account for any effects of these variables as time-invariant covariates (TIC) in the data analysis (Curran et al., 2010).

Hope

To measure the daily changing states of hope among participants, I utilized the State Hope Scale (SHS; Snyder et al., 1996). The SHS is a measurement that stems from Snyder's cognitive model of hope called Hope Theory. As mentioned previously, Snyder operationalizes hope as a type of cognitive appraisal (Munz et al., 2008; Snyder, 1994). "[It] is thinking of one's self as an agent, able to effect some change in one's life, having goals that not only have promise but also pathways to their accomplishment" (Saleebey, 2000, p.133). This theoretical framework led him develop this widely used psychometric measurement of hope, called the dispositional Hope Scale or now referred to as the Adult Hope Scale. The scale consists of two, four-item factors: a) Agency and b) Pathways. Similar to future-oriented self-efficacy, Agency refers to individuals' cognitive appraisal that they have what it takes to accomplish a goal. Pathways, in turn, reflects "cognitive mapping" (Munoz et al., 2018, p. 697) or the ability to identify steps to attain said goals.

In the dispositional Hope Scale, Snyder and colleagues (1992) first measured hope as a disposition or personality trait. Thus, if administered to one respondent continuously over time, the scores of would theoretically remain stable with little fluctuation. It consisted of four distractor items, four Agency items, and four Pathways items. In 1996, Snyder and colleagues revised the scale and developed the SHS. It measures temporal states of hope that fluctuate based on daily occurrences, making it a practical option for daily diary studies. The operational definition of state hope is a "snapshot of a person's goal-directed thinking" (Snyder, 1996, p. 321). It is a brief, 6-item scale that contains three Agency items and three Pathway items. Similar

to the original scale, responses lie on an 8-point Likert scale, ranging from 1 (definitely false) to 8 (definitely true). The content of the items directly corresponds to six items from the original scale. However, the language of the items reflects a temporal state rather than a disposition. For instance, the first Agency item in the dispositional Hope Scale states “I energetically pursue my goals.” Snyder and colleagues (1996) edited the language in the SHS to: “At the present time, I am energetically pursuing my goals.”

Like the dispositional Hope Scale, factor analysis of the SHS revealed a 2- factor structure separating items from the Agency and Pathway domains (Snyder et al., 1996). Among a sample of college students, the initial development of the SHS provided evidence of high internal consistency ($\alpha = .93$). It demonstrated strong convergent validity with the dispositional Hope Scale ($r = .79$) and state self-esteem ($r = .75$). In a sample of participants receiving inpatient treatment for substance use, it revealed an internal consistency of Cronbach’s alpha ranging from .81 - .89.

Resilience

For the purposes of this study, I operationalized resilience as cognitive, emotional, behavioral, and spiritual adaptability to stress (Johnson et al., 2011). Thus, I selected a comprehensive measure to reflect this multidimensionality of resilience. The Response to Stressful Experiences Scale (RSES; Johnson et al., 2011) is a 5-factor scale that measures the following dimensions: a) meaning-making and restoration, b) active coping, c) cognitive flexibility, d) spirituality, and e) self-efficacy. This scale includes a wider scope of resilience than other established scales such as the Brief Resilience Scale (BRS; Smith et al., 2008), which measures the *bounce back* aspect of resilience or the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), which assesses one’s ability to thrive in the face of adversity

(Ahern et al., 2006). It consists of 22 items that lie on a 5-point Likert scale (0 = “Not at all like me”, 4 = “Exactly like me”). Participants respond to each item indicating what they “tend to” do “during and after life’s most stressful events” (Johnson et al., 2011, p. 168).

Originally, Johnson and colleagues (2011) validated the RSES on the military population. Through multiple samples, it has provided evidence of convergent validity with established resilience scales such as the CD-RISC ($r = .61 - .81$) and discriminant validity with varying levels of combat exposure in military samples ($r = .02 - .18$; Johnson et al., 2011). Its established psychometrics properties extend to reliability as well. Over a one-week period, the RSES demonstrated a high level of test-retest reliability of .87 (Johnson et al., 2011). Cronbach’s alpha demonstrates an excellent internal consistency ($\alpha = .91 - .93$; Johnson et al., 2011) in a military a population. The sample from the present study demonstrated inner consistency through Cronbach’s alpha at each time point ($\alpha_{T1} = .84$, $\alpha_{T2} = .90$, $\alpha_{T3} = .92$).

Mindfulness

To assess levels of mindfulness among participants, I administered the 12-item Cognitive and Affective Mindfulness Scale – Revised (CAMS-R), which Feldman and colleagues (2007) adapted from the original 18-item CAMS. When choosing this instrument, I faced a similar choice to selecting a measurement for hope. Similar to hope, instruments can measure mindfulness as either a state or a trait. State mindfulness refers to the cognitive states of nonjudgmental awareness, which can easily fluctuate throughout the day. Trait mindfulness refers to a personality disposition to be mindful in which levels would remain stable over time. I chose a trait measurement because research suggests that meditation interventions will significantly change levels of trait mindfulness over time (Kiken et al., 2015). In other words, individuals increase their states of mindfulness during meditation but it like regresses after

meditation. However, as they practice meditating daily over a period of time, the increases of state mindfulness will stabilize at higher levels, thus increasing their trait mindfulness. Thus, we selected the CAMS-R since we plan to measure mindfulness over a period of time and because it operationalizes mindfulness as a “trainable” trait (Gawrysiak et al., 2018), as in it measures traits of mindfulness that could change with an intervention.

The CAMS-R aims to measure everyday aspects of mindfulness that apply whether respondents purposefully practice mindfulness or not, making it applicable to a wide variety of participants. Participants respond to the items on a 4-point Likert scale (1 = “Rarely/ Not at all”, 4 = “Almost always”). The CAMS-R measures mindfulness as a multidimensional construct, assessing aspects of a) Attention, b) Awareness, c) Acceptance, and d) Focus. Researchers have validated this 4-factor structure across a number of international populations through confirmatory factor analysis (Feldman et al., 2007).. Further, the CAMS-R continuously demonstrates convergent validity ($r = .51, .66$) with related dispositional mindfulness scales (Feldman et al., 2007). Further, it demonstrated evidence of discriminant validity through its negative correlation ($r = -.30$) with rumination (as measured by the Response Style Questionnaire [RSQ; Nolen-Hoeksema & Morrow, 1991]). The sample from the study demonstrated evidence of internal consistency through Cronbach’s alpha at each timepoint in the study ($\alpha_{T1} = .79, \alpha_{T2} = .80, \alpha_{T3} = .82$).

Spiritual Transcendence

In the exploratory research question, I aimed to explore the effects of spiritual transcendence in resilience over time. I used the operational definitions set forth by Piedmont (1999), which refers to a multi-faceted trait through which one connects the self to a transcendent reality. To measure spiritual transcendence, I selected the Spiritual Transcendence Scale (STS), a

factor within the Assessment of Spirituality and Religious Sentiments (ASPIRES; Piedmont, 1999). Although it is one factor, it contains three subscales: a) Prayer Fulfillment, b) Universality, and c) Connectedness. Together, they comprise a total spiritual transcendence score. A high score indicates a person who can sit in the tension of uncertainty and yet still feel satisfaction through personal meaning. Prayer fulfillment is operationalized as the sense of meaning that one receives from connecting with a higher power (e.g., “In the quiet of my prayers and /or meditations, I find a sense of wholeness”). Universality refers to the belief in the unity of life—areas of connection between oneself and a larger whole. An example would be “I feel that on a higher level all of us share a common bond.” Lastly, connectedness refers to the importance a respondent places on relationships (e.g. “The praise of others gives deep satisfaction to my accomplishments”). The STS has demonstrated a consistent factor structure among samples with varying religions and cultures (Cho, 2004; Goodman et al., 2005). In a sample of Christian adults, it demonstrated an internal consistency of ($\alpha = .77 - .85$; Fox et al., 2016). Further, it has been validated and translated with several languages including Korean (Kim et al., 2012), Chinese (Lau et al., 2016).

Stress

To measure the effect of Centering Prayer on stress, I administered the Perceived Stress Scale (PSS; Cohen et al., 1983). Building this study off of Lazarus and Folkman’s transactional stress theory, I chose this scale specifically because it differs from objective assessments of stress and measures one’s perception or *cognitive appraisal* of stress. In other words, the items ask respondents to rate their thoughts and feelings (e.g., feelings of irritability, thoughts of not being able to cope) over the last month. In addition, meditation practice associates to improved

scores of the PSS (Chu, 2010; Gutierrez, Conley & Young, 2016; Lane, Seskevich, & Piper, 2007).

Cohen et al. (1983) developed several versions of the scale including a 14-, 10-, and 6-, 4-item scale (Lee, 2012). The two larger scales have a 2-factor solution, while the smaller scales are unidimensional. However, we selected to use the 10-item scale because it the strongest psychometric properties across several populations (Lee, 2012). In a sample of adults with chronically ill children, the PSS-10 demonstrated acceptable test-retest reliability ($r = .77$) over a 2-week period (Remor, 2006). In 11 studies with adult samples, it provided evidence of internal consistency through Cronbach's alpha ($\alpha = .74 - .91$; Lee, 2012). Its 2-factor solution continually displays adequate fit through exploratory factor analysis and confirmatory factor analysis. It demonstrated convergent validity ($r = .73$) with the Strait Trait Anxiety Scale (STAI; Spielberger, 1983) as well as discriminant validity through no correlation with the Adult Overt Aggregation Scale (OA; Roberti, Harrington, & Storch, 2006). The sample in the present provided evidence of internal consistency at each timepoint in the study $\alpha_{T1} = .84$, $\alpha_{T2} = .89$, $\alpha_{T3} = .84$).

Summary

Chapter three outlined the methodology proposed for this research study to examine the topics that Chapter One and Chapter Two presented. The research study aims to test a theoretical model that posits: a) centering prayer effectively increases resilience (as measured by the RSES; Johnson et al., 2011), b) hope (as measured by the SHS; Snyder et al., 1996) serves as a significant time-varying covariate of resilience, c) centering prayer has a stabilizing effect on fluctuating levels of hope. After describing the model, this chapter reviewed the research questions, sampling procedures, data collection, instrumentation, and data analysis.

CHAPTER FOUR: RESULTS

Chapter four describes the research outcomes from the study. The primary aim of the study was to examine the effectiveness of a centering meditation on resilience. An ancillary purpose was to investigate the effect of centering prayer on the dynamics of hope. Lastly, the study explores the temporal dynamics of resilience and its relationship with hope, spiritual transcendence, stress, and mindfulness. An outline of the research results includes a) the outcome of the randomized controlled trial on the effectiveness of centering on resilience, b) a linear growth model mixed model that estimates the time-varying influence of hope on resilience, c) a series of growth curve models on the relationships of spiritual transcendence, stress, and mindfulness on resilience, and d) a time series analysis of bi-daily levels of hope in the treatment group and control group. This chapter also provides participant demographics, various statistical analyses, and the results of the longitudinal study.

Demographic Characteristics

Eligible participants were adult students enrolled in either undergraduate or graduate programs. The CONSORT diagram Figure 6 presents the sequence of participation among participants from recruitment to final analysis. After completing the baseline protocol, 190 participants enrolled in the study. Intention-to-Treat (ITT) procedure requires participants to complete at least one follow-up assessment after the study begins to be part of the analysis (McCoy, 2017). Of the 190 randomized participants, 155 participants sufficiently followed protocol through to complete the entire study. I removed 5 participants who were outliers in the preliminary data analysis. Table 1 provides the descriptive statistics for the original sample who completed the baseline protocol and the final sample used in the data analysis. The 150 participants in Table 1 reflect the final sample.

Table 1

Summary of Descriptive Statistics for Eligible Baseline Participants Invited for a 4-week Meditation Study and Follow-Up Data Analysis.

Variable	Eligible Sample Participants at Baseline Protocol (<i>n</i> = 190)	Final Sample of Participants in Data Analysis (<i>n</i> = 150)
Age, mean, SD	27.03 (7.61)	27.10 (7.38)
Gender		
Male	26 (14%)	19 (13%)
Female	157 (83%)	126 (84%)
Nonbinary	4 (2%)	3 (2%)
Prefer not to answer	3 (2%)	2 (1%)
Race		
White	125 (66%)	97 (65%)
Multiracial	21 (11%)	19 (13%)
Hispanic/Latinx	20 (11%)	16 (11%)
Black/African American	16 (8%)	12 (8%)
Asian	4 (2%)	3 (2%)
Other/Prefer not to answer	4 (2%)	2 (2%)
Level of Education		
Undergraduate	26 (14%)	21 (14%)
Graduate	164 (86%)	129 (86%)
Spiritual/Religious Identity		
Spiritual	68 (36%)	50 (33%)
Spiritual and religious	32 (17%)	27 (18%)
Religious	25 (13%)	18 (12%)
None	53 (28%)	45 (30%)
Other/Prefer not to answer	12 (6%)	10 (7%)

Preliminary Data Analysis

Before data analysis, I downloaded the survey data from Qualtrics onto MS Excel for data cleaning and examined the preliminary descriptive statistics. Qualtrics required participants to complete each survey to move forward, so each completed assessment had no missing items. Each measured variable (e.g., resilience, hope, mindfulness) was normally distributed based on

the Shapiro-Wilks test, $p > .05$. Since the several research questions concern differences in resilience and hope based on treatment group, Table 2 presents the descriptive statistics on resilience and hope divided by treatment group at each time point. A cursory glance at the descriptive statistics in Table 2 shows how each hope and resilience in the treatment group increase over time at a greater slope than the control group. Table 3 presents the descriptive statistics for all the measured variables in the study.

Table 2

Univariate Descriptive Statistics for Response to Stressful Events Scale (RSES) and State Hope Scale (SHS) broken out by treatment group.

	Resilience			Hope ¹		
	T ₁	T ₂	T ₃	T ₁	T ₂	T ₃
Treatment Group ($n = 61$)						
Mean	59.25	61.47	64.46	36.72	38.82	39.96
Standard Deviation	9.57	11.83	12.06	5.30	5.30	5.47
Comparison Group ($n = 89$)						
Mean	58.19	59.25	60.44	36.69	38.13	38.26
Standard Deviation	10.70	12.60	12.70	6.54	6.48	6.26

¹ The SHS was normed on college students with a mean and standard deviation of 35.12 (5.85).

Table 3

Univariate Descriptive Statistics for Response to Stressful Events Scale (RSES), State Hope Scale (SHS), Cognitive and Affective Mindfulness Scale (CAMS), Spiritual Transcendence Scale (STS), and Perceived Stress Scale (PSS)

	Mean			Standard Deviation		
	T ₁	T ₂	T ₃	T ₁	T ₂	T ₃
Resilience	58.62	60.12	62.10	10.23	12.31	12.55
Hope	36.70	38.41	38.93	6.05	6.02	6.00
Mindfulness	31.21	31.73	32.12	5.09	5.16	5.20
Spiritual Transcendence	77.73	78.50	79.81	5.35	5.99	5.47
Stress	20.05	19.06	18.68	16.02	15.55	15.30

Note. T₁= Day 1, T₂ = Day 14, T₃ = Day 28,

After conducting the descriptive statistics, I formatted the data and prepared it for analysis. For the first, third, and exploratory research questions, I converted the dataset into person-period dataset (long format) and uploaded it to Statistical Analysis System (SAS; Cary, NC) for data analysis. For the second research question, I uploaded the data to the Statistical Package for the Social Sciences (SPSS; IBM, 2020) to analyze it through the SPSS Expert Modeler feature.

Results of Research Question One

The first research question reflects the study's primary aim, which is to examine the effectiveness of centering prayer on increasing resilience. The first research question asks the following:

Is there a significant difference in resilience levels (as measured by the Response to Stressful Events Scale [RSES; Johnson et al., 2011]) between individuals who participate in bi-daily meditation and a comparison group?

Preliminary Analysis

I ran a growth curve model with resilience as the outcome variable (Bolger & Laurenceau, 2013). Analyzing the data through PROC MIXED on SAS, I used a variance components covariance structure to fit the model. To compare change over time between groups, I included three fixed in the model: a) time, b) group, and c) group-over-time interaction (Bolger & Laurenceau, 2013; Forman, 2019). Table 4 presents the parameter estimates of the model. Because I randomized participants to treatment and control conditions, I did not expect to see group differences in average resilience levels (Bolger & Laurenceau, 2013). Instead, the interaction term (Group*Time) determines if the change in resilience over time is significantly different between the treatment and control groups. Thus, based on research hypothesis one, I expected a significant group-over-time interaction (Group*Time).

When determining if a growth curve model is appropriate for a dataset, it helps to conduct an unconditional growth model. The unconditional growth model estimates the variance in resilience over time (Singer & Willett, 2003). With the results, I was able to calculate an intraclass correlation (ICC) of 77.28%. In a growth curve model, time is nested within participants, and I can conclude that 23% of the variance is accounted for by the changes within a person over time.

$$ICC = \frac{\tau^2}{\tau^2 + \sigma^2} \quad (4.1)$$

The ICC gives a proportion of how much variation in resilience lies between people (Grace-Martin, 2013). Because of the variance of .77, I included time as a random intercept and slope to account for the observations within participants.

Main Analysis

After a four-week treatment of centering meditation, the interaction between group and time was statistically significant in explaining the trajectory of resilience, ($\beta = 1.67$, $SE = .75$, $df = 126$, $p < .05$, $CI_{95} = .20, 3.14$). The fixed effect of 1.67 is the difference in the slope between the treatment and control groups (Bolger & Laurenceau, 2013). In other words, in two weeks, the treatment group had a rate of change in resilience that was 1.67 units greater than the control group. To elaborate on the other fixed effects, time had a statistically significant fixed effect on resilience, ($\beta = 1.08$, $SE = .47$, $df = 148$, $p < .05$, $CI_{95} = .16, 2.00$). As expected, the group did not have a statistically significant fixed effect on the change of resilience over time, $p = .58$. Without accounting for time, there were no distinguishable group differences in resilience levels.

I calculated the effect size through a classical approach of Cohen's d , using the difference in pre- and post-test means of resilience over their pooled standard deviation (1988). The treatment group generated a within-group effect size of $d = .48$, which approximately reaches a medium effect (Cohen, 1988). The means in resilience also grew slightly in the control group, but the effect was smaller than Cohen's cut-off for a small effect ($d = .19$). Another method to estimate effect compares the unconditional growth model results with the treatment growth model. Based on the parameter estimates from Table 4, it is clear that the intervention over time had a statistically significant effect on estimating the trajectory of resilience, $p < .05$. It also reduced the variance in random slope. Using the following equation, $[(5.61 - 4.87)/(4.87) =$

0.15], I can deduce that adding the effect of centering to the model results in a 15% reduction in variance for the slope (Singer, 1998).

Table 4

Parameter estimates for the Treatment Growth Model compared to the Unconditional Growth Model.

	Model A Unconditional Growth Model	Model B Treatment Growth Model
<i>Fixed Effects (intercept, slope)</i>	Estimate (SE)	Estimate (SE)
Intercept	58.50*** (.89)	58.09*** (1.16)
Time ^a	1.75*** (.75)	1.08* (.47)
Group ^b		1.00 (1.81)
Time*Group		1.67* (.75)
<i>Random Effects (co-variances)</i>	Estimate (SE)	Estimate (SE)
Intercept τ^2 (Between-Person)	94.84 (12.83)	95.41*** (12.92)
Time	5.61* (2.42)	4.87* (2.35)
Residual σ^2 (Within-person)	27.89 (2.92)	27.96*** (2.93)
ICC	77.28%	

^a Time refers to three time points T₁= Day 1, T₂= Day 14, T₃= Day 28. The slope indicates the increase resilience per 14-day time period.

^b Group refers to the treatment group and control group

* $p < .05$

** $p < .01$

*** $p < .000$

Results of Research Question Two

The second research question addresses the effect of centering prayer on the dynamic trends of hope. As mentioned in previous chapters, it asks the following question:

In both the treatment group and comparison group, will the autocorrelative patterns of hope (as measured by the SHS) fluctuate as a state, remain stationary as a trait/disposition, or change in trend over time (measured through an ARIMA time series model)?

To answer the research question, I used an ARIMA time series model to detect state hope's stability and trends twice a day for four weeks. I created one time series for the comparison group and one time series for the treatment group. The time series results indicate if the trends of hope remain stationary or changed direction over time. Figure 7 presents the natural time series of 150 students who took the State Hope Scale each morning and each night.

Statistical Assumptions

Before conducting a modeling procedure on the time series shown in Figure 7, I confirmed that the data met the necessary statistical assumptions for time series analysis. The number of time points ($n = 56$) in the time series was over the recommended minimum number of time points for time series, $n > 50$ (Tabachnick & Fidell, 2019). Residuals followed a normal distribution in the treatment and control groups. The plots of standardized residuals versus predicted values met the assumptions of heterogeneity of variance. Time series data naturally have non-independent, autocorrelated residuals, but the ACFs and PACFs plot indicate that ARIMA model structure sufficiently removed the autocorrelation of residuals. Lastly, the time series plots before and after the models show no major outliers.

Overview of ARIMA Model

The first finding from the time series model directly answers the second research question. Based on my sample, hope appears to possess both state- and trait-like qualities. After four weeks of data collection, trends and variance of hope were estimable and did not indicate pure randomness. Mathematically speaking, the levels of hope did not form a white noise model. Instead, the average level of hope at a subsequent future time point was predictable based on a regression formula given the present level of hope. This type of AR(1) model indicated statistically significant autocorrelation, the kind of consistency that points to *trait hope*. However, based on the evidence from graphical representation (see Figure 7), the movement in the levels of hope is not static. Both time series models indicated R^2 values under 50%, leaving over 50% of the variance due to unobserved variables. This unknown, fluctuating movement of hope suggests state-like qualities. Although a person has an overall expected level of hope, the momentary levels of hope move freely from this expected level from morning to evening. It is trait-like because the model suggests it will regress to a predicted level over time.

Figure 7

Four weeks of bi-daily state hope measures (56 observations)

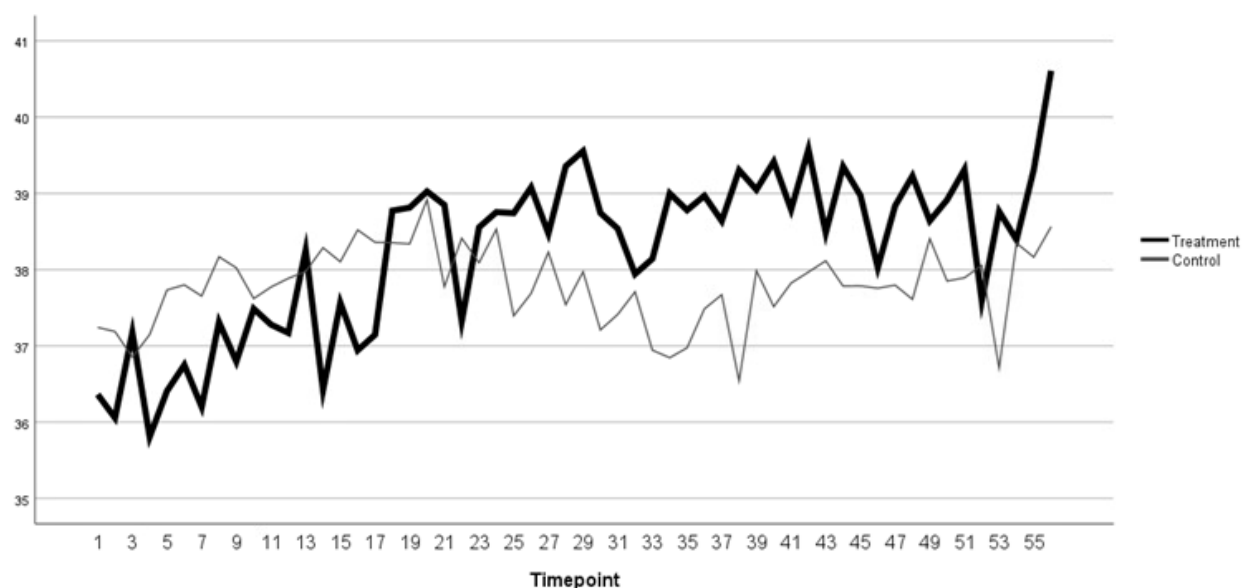


Table 5*Parameter estimates of time series analysis*

Model	Parameter	Estimate	SE	Ljung-Box	Normalized BIC	Stationary R ²
Treatment				.117	-.64	.56
	AR	-.50**	.12			
	Difference	1				
Control				.160	-1.37	.24
	AR	.87**	.12			
	MA	.57*	.20			

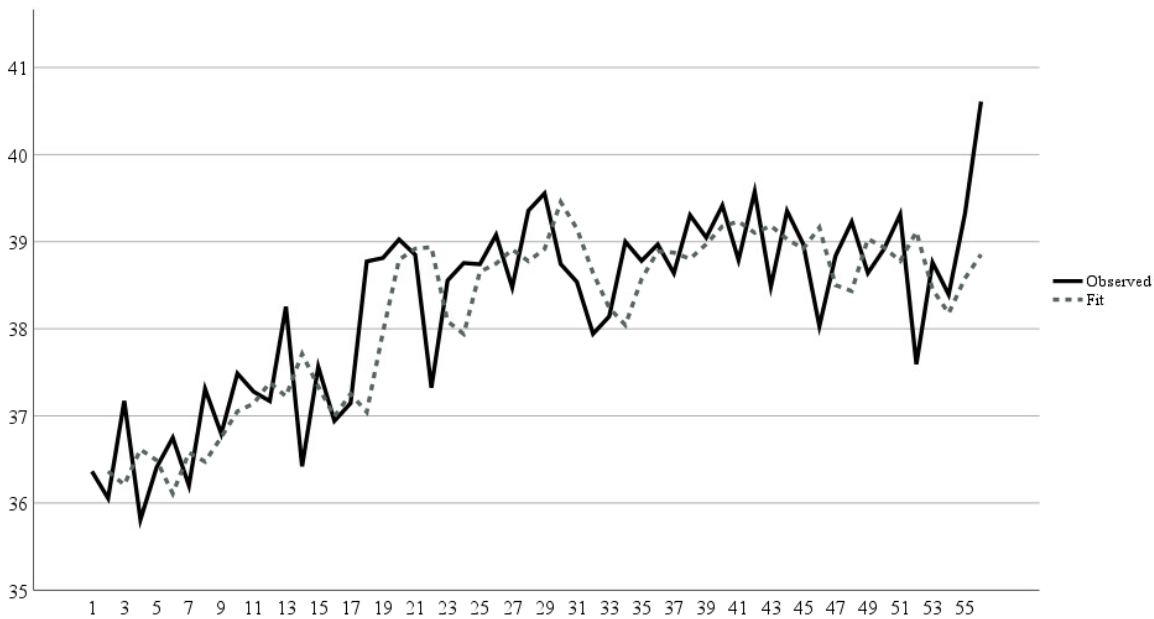
* $p < .01$ ** $p < .000$ **Treatment Group**

Based on SPSS Expert Modeler estimation, the treatment group followed an ARIMA (1, 1, 0) model, $p < .000$. Figure 8 presents the time series graph of the modeled time series and the observed time series. The Ljung-box statistic was not statistically significant, indicating serial autocorrelation in the data (Tabachnick & Fidell, 2019). The model follows an ARIMA (p, d, q) procedure. The p (1) indicates positive trend autocorrelation (see Figure 8), $p < .000$. It uses the observation from the previous timepoint (y_{t-1}) to forecast the next time point (y_t) $p < .000$. The d (1) figure indicates that the procedure differenced (or detrend) the data to make it stationary, a prerequisite for time series analysis. In other words, the natural time series had a *constant average trend* in an inclining direction. As shown in Figure 8, the model indicates that hope followed a positive trend with statistical significance. Put another way, states of hope vary each day, but the trend (or trait) of hope steadily increases over time. The q (0) concerns the moving average regression model in the ARIMA procedure. In this model, the previous error term $\theta_{\varepsilon_{t-1}}$ of

any time point has no significant relationship with the next observed value at time t . To determine effect size, I referred to stationary R^2 , which was .56, indicating the model accounted for 56% of the variance while controlling for the data trend.

Figure 8

ARIMA (1, 1, 0) model of observations and model-fitted values in the treatment group in 56 timepoints.



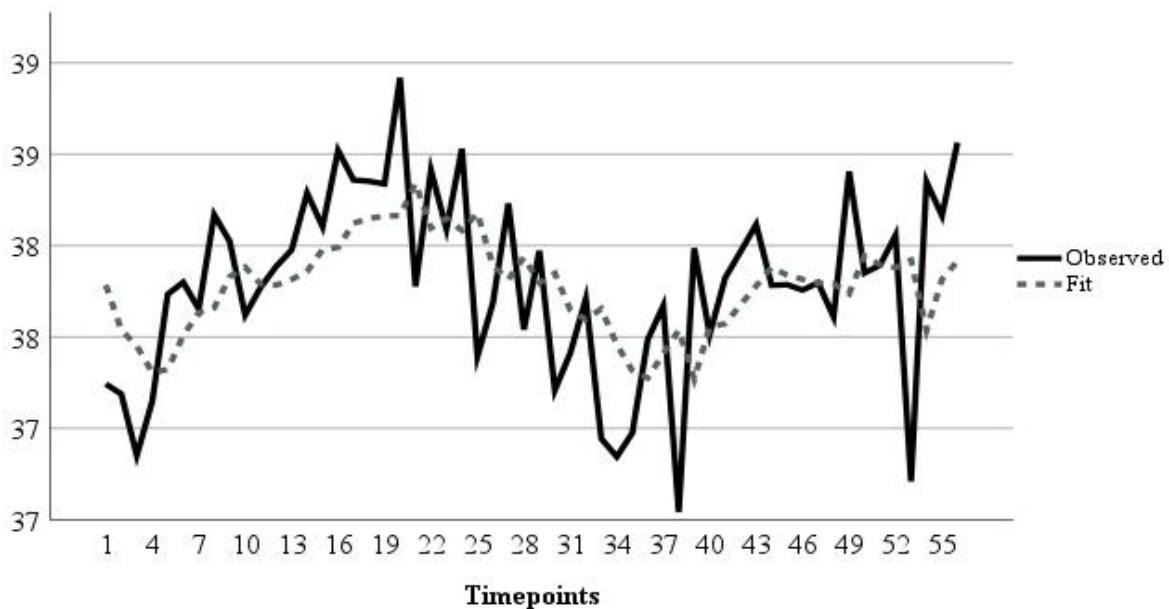
Control Group

The time series of the comparison group followed an ARIMA (1, 0, 1) model. Figure 9 presents the graph of the time series including the modeled fit and observed values. Once again, the Ljung-box statistic was not statistically significant, indicating serial autocorrelation in the data (Tabachnick & Fidell, 2019). Also, using the (p, d, q) model, the $p(1)$ in this model indicates positive trend autocorrelation (see Figure 11), $p < .000$. The level of hope in the evening correlates significantly with the level of hope that morning. The $d(0)$ figure indicates that the data is stationary. Although the levels of hope vary each day, the average hope remains

at a baseline that is held constant through the four weeks. As shown in Figure 9, the model indicates that hope has no average trends. The $q(1)$ indicates that the model forecasts future values based on correlating current error terms with previous error terms. Overall, an ARIMA (1, 0, 1) model indicates that no matter at what time point of the four weeks, the expected level of state hope at time t correlates significantly to the last level of state hope (y_{t-1}), added or subtracted by part of the previous error term $\theta_{\varepsilon_{t-1}}$. This model had a stationary R^2 of .24, indicating that the model accounted for 24% of the variance.

Figure 9

ARIMA (1, 0, 1) model both observations and model-fitted values of the control group in 56 timepoints.



Results of Research Question Three

The following research questions move beyond the randomized controlled trial and examine the temporal dynamics of resilience more closely. As the second research question

shows, hope had unique dynamics in this study and is worth exploring more concerning resilience. Thus, in this next research question, I examined if hope significantly explains resilience's trajectory over time.

What is the trajectory of resilience (as measured by the RSES [Johnson et al., 2011]) when accounting for hope (as measured by the State Hope Scale [SHS; Snyder et al., 1996]) as an explanatory variable?

To address the research question, I conducted two models to examine the dynamic effects of hope on resilience. First, I created a growth curve model to examine the effects of hope as a fixed effect and time as a random effect. I used SAS PROC MIXED to analyze the data and used a variance components covariance structure. I added hope, time, and a hope-over-time interaction as fixed effect parameters. Because of the intraclass correlation from the unconditional growth curve model, I retained time as a random intercept and slope in the model. Secondly, I created a longitudinal within-subject mediation model to explore how time influences resilience *through* hope.

Growth Curve Model

In this growth curve model, hope over the course of time has a statistically significant effect on the trajectory of resilience ($\beta = .19$, $SE = .07$, $df = 124$, $p < .01$, $CI_{95} = .05, .33$). In two weeks, resilience grows at an average rate of .19 units at every unit increase of hope. 95% of participants have slopes between .05 and .33. Table 5 presents the parameter estimates and compares this model (Model C) and the unconditional growth model. The other fixed effects of hope and time have contrasting effects on the trajectory of resilience. Time has a negative effect on resilience ($\beta = -6.02$, $SE = 2.49$, $df = 148$, $p < .05$, $CI_{95} = -10.90, -1.14$). Thus, expected levels of resilience (RSES score) decrease by 6.02 units every two weeks. It is noteworthy that

the unconditional growth model suggests that resilience statistically significantly grows at a rate of 1.75 units of resilience over time. Thus, when hope enters the model, the effect of time on resilience changes in both magnitude and direction. Hope has a significant fixed and positive effect on the trajectory of resilience, ($\beta = .47$, $SE = .11$, $df = 124$, $p < .000$, $CI_{95} = .25, .69$). This change may suggest the following narrative: Things do not necessarily better with time, but they get better with hope.

Table 6

Comparison of the Unconditional Growth Model and a Growth Model with Hope on the trajectory of Resilience

	Model A Unconditional Growth Model	Model C Hope Growth Model
<i>Fixed Effects β (SE)</i>		
Intercept	58.50*** (.89)	41.29*** (4.04)
Time	1.75*** (.75)	-6.02* (2.49)
Hope		.47*** (.11)
Time*Hope		.19** (.07)
<i>Random Effects / Variance Components</i>		
Intercept τ^2 (Between-Person)	94.84*** (12.84)	68.44*** (10.29)
Time	5.61** (2.41)	2.30 (2.17)
Residual σ^2 (Within-person)	27.89*** (2.92)	30.29*** (3.18)

Note. $N = 150$

* $p < .05$

** $p < .01$

*** $p < .000$

^a The t-value column reflects z-values in the random effects section

^b All p -values are two tailed.

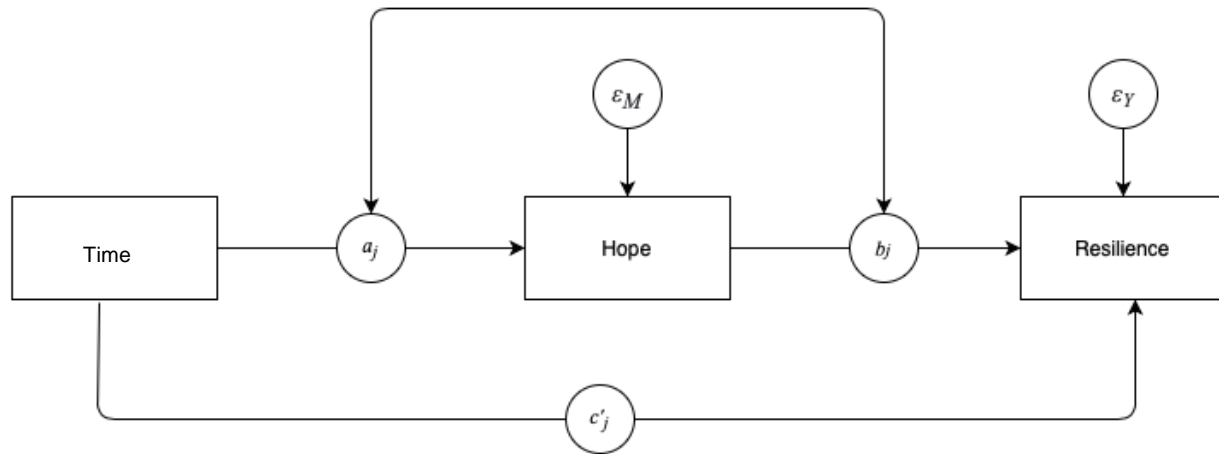
To further interpret the model, the fixed effects in Table 6 describe a traditional regression model predicting resilience, and random effects represent the covariances in the mixed model. Comparing the variance components in both models shows that hope dramatically reduces the variance in random effects. The variance in intercept decreases by approximately 28%, and the variance in slope decreases by 59%. Comparing Model C to Model B), hope reduces the variance more than the intervention does. Specifically, it reduces the variance in slope (growth rates) almost four times more than the treatment model did (15%).

Longitudinal Within-Person Mediation Analysis

Generally seen in cross-sectional studies, mediation analysis allows researchers to examine one variable's effect on an outcome through a third-party variable. In this study, I am interested in examining how people increase their resilience over time, and I am most interested in understanding how hope influences the increase in resilience. The previous results indicated that group did not have a statistically significant effect on resilience, $p = .58$. Although I included group in the model, I primarily aimed to examine the mediating effect of hope on resilience *within individuals* (Bolger & Laurenceau, 2013). To do so, I designed a mediation model to test if time influences resilience based on hope. Figure 11 presents the mediation model.

Figure 10

Within-subjects mediation: Diagram and structural equations of hope mediating the effects of time on resilience within a participant.



The data provides evidence that time (X) predicts greater levels of hope (M) within a person. Every two weeks, a person's hope is predicted to be 1.99 units higher ($\beta = 1.99$, $SE = .66$, $t = 3.24$, $p < .01$, $CI_{95} = .67, 3.31$). 95% of the participants have slopes between .67 and 3.31. The hope (M) to resilience (Y) slope for the average participant is .60 ($SE = .09$, $t = 6.87$, $p < .000$, $CI_{95} = .43, .78$). This part of the model predicts that as each unit of hope increases, resilience will increase by .60 units. As the confidence interval indicates, 95% of participants have a slope between .43 and .78. In turn, hope predicts the outcome of resilience $\beta = .60$, $SE = .09$, $t = 6.87$, $p < .000$, $CI_{95} = .43, .78$). The model also presents evidence of a direct effect of time (X) on resilience (Y) for the average participant, such that after adjusting for hope (M), each additional unit of time predicts an increase in resilience of 2.43, ($SE = .69$, $t = 3.51$, $p < .000$).

Table 7

Parameter estimates of hope mediating the effects of treatment group on resilience.

	Estimate (β)	SE	t^a	p^b	CI_{95}	
					Lower	Upper
<i>Fixed Effects</i>						
dm	36.64	0.48	75.99	< .0001	35.69	37.60
dm*Time01	1.99	0.66	3.24	.0034	0.67	3.31
dy	34.83	3.17	10.99	< .0001	28.55	41.12
dy*Hope	0.60	0.09	6.87	< .0001	0.43	0.78
Time01*dy	2.43	0.69	3.51	.0007	1.06	3.81
<i>Random Effects</i>						
UN(1,1)	92.78	68.82	1.35	0.0888	32.11	896.67
UN(2,1)	-1.58	0.98	-1.61	0.1068	-3.51	0.34
UN(2,2)	0.06	0.01	5.36	< .0001	0.04	0.09
Time dv m	32.80	2.19	14.97	< .0001	28.89	37.55
Time dv y	31.65	2.84	11.16	< .0001	26.75	38.04

^a The t-value column reflects z-values in the random effects section

^b All p -values are two-tailed.

Results of Exploratory Research Question

To answer the exploratory research question, I examined if mindfulness, spiritual transcendence, and stress had a statistically significant effect on resilience's trajectory over time.

The exploratory question is listed below again:

What are the roles of mindfulness (as measured by the Cognitive and Affective Mindfulness Scale-Revised [CAMS-R; Feldman et al., 2007]), spiritual transcendence (as measured by the Spiritual Transcendence Scale [STS; Piedmont et al., 1999]), and stress (as measured by the Perceived Stress Scale [PSS, Cohen]) in the trajectory of resilience over time?

To answer the exploratory research question, I added each variable one at a time as a fixed effect to the linear growth model and examined its effect on resilience. Models A – E in Table 5 depict

the results of each model. I included the unconditional growth model and hope growth model for comparison. All of the models reduce the variance in the random effects (observations within participants).

As Table 5 indicates, each explanatory variable has a significant effect on the trajectory of resilience. Out of each variable, mindfulness had the largest effect on slope ($\beta = .89$, $SE = .11$, $df = 407$, $p < .000$, $CI = .66, 1.12$). For every unit increase in mindfulness (CAMS score), resilience increases by .89 units. Further, 95% of participants had a slope between .66 and 1.12. This lower limit of the confidence interval is higher than the fixed effect of hope on resilience. However, note that the hope-over-time interaction has a larger effect on resilience than any other variable. The slope of the mindfulness-over-time effect is .15, ($SE = .07$, $df = 195$, $p < .05$, $CI = .01, .28$). Spiritual transcendence has unit slope of .25 with resilience ($SE = .05$, $df = 322$, $p < .000$, $CI = .16, .34$). Its interaction with time had a smaller slope as usual at .08 ($SE = .02$, $df = 166$, $p < .000$, $CI = .03, .12$). According to this model, 95% of participants had a slope between .03 and .12. As expected, stress had a negative fixed effect on resilience ($\beta = -.58$, $SE = .11$, $df = 397$, $p < .000$, $CI = -.79, -.36$). Its interaction with time has a smaller but still negative effect of -.14 ($SE = .07$, $df = 203$, $p < .000$, $CI = -.27, -.01$).

Table 8*Parameter estimates for linear growth models predicting the trajectory of resilience*

	Model A Unconditional Growth Model	Model B Growth Model Treatment Predictor	Model C Growth Model Hope Predictor	Model D Growth Model Spiritual Transcendence Predictor	Model E Growth Model Mindfulness Predictor	Model F Growth Model Stress Predictor
<i>Fixed Effects (SE)</i>						
Intercept	58.50*** (.89)	58.09*** (1.16)	41.29*** (4.04)	39.22*** (3.54)	30.73*** (3.69)	70.07*** (2.29)
Time	1.75*** (.75)	1.08* (.47)	-6.02* (2.49)	-4.85** (1.81)	-3.27 (2.20)	4.06** (1.34)
β_{10} Predictor ^a		1.00 (1.81)	.47*** (.11)	.25*** (.05)	.89*** (.11)	-.58*** (.11)
Time * Predictor		1.67* (.75)	.19** (.07)	0.08*** (.02)	.15* (0.07)	-.14* (.07)
<i>Random Effects (Variance Components)</i>						
Intercept (Between-person)	94.84*** (12.84)	95.41*** (12.92)	68.44*** (10.29)	71.94*** (10.05)	64.96*** (9.10)	74.63*** (2.29)
Time	5.61** (2.41)	4.87* (2.35)	2.30 (2.17)	2.68 (2.07)	3.74* (2.01)	3.72* (2.10)
Residual σ^2 (Within-person)	27.89*** (2.92)	27.96*** (2.93)	30.29*** (3.18)	28.04*** (2.92)	24.70*** (2.62)	26.42*** (2.80)

* $p < .05$ ** $p < .01$ *** $p < .000$ ^a The predictor variable is different for Models B – F (e.g., Treatment Group, Hope, Spiritual Transcendence, Mindfulness, and Stress)

Conclusion

To summarize, chapter four presents a detailed description of the longitudinal data analysis I used to reach the study findings. The analysis begins with an unconditional growth model that provides a basis for using a growth curve modeling approach. The results confirmed the first research hypothesis, which stated that the treatment group would have higher resilience following four weeks of centering treatment than the control group. The results of the growth curve model on SAS Proc Mixed showed that the results were statistically significant. To answer this research question, I created a growth curve model and within-subject mediation model to analyze how hope affected the trajectory of resilience in both groups. The results indicated that hope and group did not have a statistically significant interaction. However, hope and time had a significant interaction on resilience. The exploratory research question results indicated that mindfulness, stress, and spiritual transcendence all were statistically significant time-varying covariates of resilience. Lastly, the results confirmed the fourth research that the treatment group had a more stabilizing time series than the control group, in which hope levels were more erratic and state-like. Further, hope functioned with a positive trend in the treatment group, showing an increase of trait-like hope.

CHAPTER FIVE: DISCUSSION

With mental health needs climbing steadily on campuses, the college counseling field issued a widespread call for evidence-based treatments that students can access at home or outside of brick-and-mortar counseling centers (Xiao et al., 2017). To respond to this call to the field, I sought to test a centering meditation as a potentially effective intervention to bolster resilience among college students. Meditation has become a prevalent mental health resource for university students, and students have also benefited from online meditation resources (i.e., Headspace, Koru Mindfulness; Forbes et al., 2018; Greeson et al., 2014). The research on the efficacy of these resources so far has been on nonsectarian meditation. However, I chose to examine the effectiveness of a spiritual meditation, potentially filling a gap in the research literature and meeting the transitioning needs of the college population. In the last ten years, 90% of college students expressed interest in spirituality (Astin & Astin, 2010), and this wave of generational interest is only rising (Longsdorf, 2018). Further, addressing clients' spiritual needs is critical to multiculturally competent counseling, and research on evidence-based practices could benefit from reflecting the various spiritual needs of individuals. A spiritually oriented meditative intervention could serve as an intervention to address spirituality in counseling, but there is the need for additional empirical support.

In the first experimental trial on the effectiveness of a centering prayer meditation (Fox et al., 2016), the results showed that centering effectively increased resilience among college students. Also, I examined the underlying dynamics of its effectiveness through its relationship with hope, mindfulness, stress, spiritual transcendence over time. This final chapter's general components include an interpretation of the findings, a discussion of the limitations, and a description of the implications for counselors and researchers.

Summary and Interpretation of Research Question One

The first research question represents the study's primary purpose and asks if centering meditation can increase college students' resilience. Chapter Three describes the randomized control trial designed and implemented in the study to answer the research question. The growth curve model presented a statistically significant increase in the treatment group's resilience levels compared to the control group. The within-group effect size ($d = .48$) from the treatment group indicates that centering prayer has an approximately medium effect on resilience over four weeks (Cohen, 1988). Thus, practicing centering prayer for four weeks can be extended to increase average levels of resilience by nearly half a standard deviation. The within-group effect size of the control was negligible ($d < .2$). Based on these findings, I concluded that centering prayer was an effective treatment for bolstering resilience in the college population.

Alternative Treatments for the College Population

As mentioned earlier, stress in the college environment is critically high, which leads to an overwhelming caseload for college counseling offices across the country (Xiao et al., 2017). To face this escalating concern in college mental health, college counselors are looking for home-based treatments or complementary and alternative medicine (CAM; Johnson & Blanchard, 2010) to boost college students' mental health. Over 50% of students generally rely on at least one kind of CAM, and the literature already shows online meditations as an evidence-based CAM for college students (Forbes et al., 2018; Greeson et al., 2014). For instance, a randomized control trial on the effectiveness of the Koru Mindfulness app demonstrated significant group interactions (Treatment, Wait List Control) in the expected directions for perceived stress ($p < .05$, $d = .45$), sleep problems ($p < .05$, $d = .45$), mindfulness ($p < .001$, $d =$

95), and self-compassion ($p < .001$, $d = .75$). Similarly, Forbes and colleagues (2017) conducted a 10-session online mindfulness meditation intervention for college students.

These kinds of findings point to online meditation training as a promising evidence-based intervention for college students. Still, these studies generally provide evidence for nonsectarian, mindfulness-based practices and exclude spiritual meditations. Over recent decades, young adults have been increasingly gravitating to spiritual approaches in wellness routines (Longsdorf, 2018). The main feature that sets this study apart from studies like the RCT for the Koru app or other mindfulness meditations is the spirituality component. Whether or not it is the result of the spirituality component, this study's findings had another unique element regarding adherence rate.

Also, since college students would not be attending regular counseling appointments when using CAM, it is imperative to find an alternative treatment that keeps students engaged. Generally speaking, the research shows that college students rarely maintain adherence rates over 50% with online meditations (Forbes et al., 2014). Forbes and colleagues (2014) conducted a study on adherence to a 10-session mindfulness meditation. They found adherence rates generally ranged from 23 -53% (Cavanagh et al., 2013; Howell et al., 2014). The students in my study had a 75% adherence rate in a 4-week study involving bi-daily practice.

Effectiveness in Resilience Outcomes

As for the outcomes of resilience, the research on the relationship between meditation and resilience is still in its early stages (Waechter & Wekerle, 2015). Generally, empirical studies demonstrate how meditation increases constructs related to resilience such as stress adaptation or other wellness factors. From these studies, researchers inferred that resilience increases based on the practice of meditation. However, few researchers conducting meditation

studies measure resilience as its own operationalized, measurable construct. Given the results from this study, the research literature now has more robust empirical evidence of a direct connection between resilience and meditation. Based on my review, the literature does present one trial of meditation on the effects of resilience, and its results support my findings. Hwang and colleagues (2018) reported a statistically significant increase in resilience among adults who received four days of intensive mindfulness training at a residential Buddhist meditation program. While Hwang and colleagues provided empirical support for short-term mindfulness meditation doses from in-person training programs, my current study offers support for home-based, online meditation. Further, Hwang et al. (2018) recruited a purposive sample from a Korean adult population who had previously chosen to participate in a renowned Buddhist meditation program. My findings stem from a U.S. sample of university students who did not necessarily indicate a predisposition towards meditation.

Effectiveness of Centering Prayer

The findings from the first research question build the meditation literature in several key areas. First, this trial provides the first empirical evidence of centering prayer's effectiveness as a mental health intervention (Fox et al., 2016). The results support the use of centering prayer as evidence-based practice in increasing resilience among college students. Thus far, the research literature on centering prayer has consisted of case studies, qualitative studies, and a pilot quantitative study (Ferguson et al., 2010; Fox et al., 2015; Fox et al., 2016; Johnson et al., 2009). In the most recent pilot study, Fox et al. (2016) recommended an experimental design as the next step in research (Fox et al., 2015; 2016, Johnson et al., 2009), and the findings from my experimental design are still consistent with the findings of previous studies. For instance, in a

sample of 9 students in a pastoral counseling program, stress and anxiety decreased with statistical significance after participating in a centering prayer workshop (Fox et al., 2016).

Similarly, Ferguson and colleagues (2010) recruited a sample of 15 Roman Catholic parishioners and assigned them to an intervention group and comparison group to test the decreases in trait anxiety. Both the treatment and control group exhibited a statistically significant reduction in anxiety, which the authors considered attributed to seasonal anxiety decreasing from winter to spring. The anxiety in the intervention group decreased with a large effect ($d = 1.4$; Cohen, 1988), and the anxiety of the comparison group decreased with a medium effect ($d = .76$; Cohen, 1988). These similar results between groups suggest a need for a larger sample size, random allocation, and statistical accountability for time. The research design I used addresses all of these concerns and supports their findings on the effectiveness of centering prayer. My sample size consisted of 150 participants who received a random assignment to either a treatment or control group. Also, unlike Ferguson's longitudinal study, the parameters of my model account for group-over-time interactions. In my study, both groups increased in resilience, similar to how anxiety decreased in both groups in Ferguson's study. However, because of the set-up of parameters, my model could detect a greater rate of change in the treatment group than the control group, $p < .05$.

Summary and Interpretation of Research Question Two

This research question aimed to examine the effect of centering prayer on the dynamics of hope. As shown in previous chapters, the findings have implications for the dynamics of resilience, and a later section of this chapter will further elaborate on its relevance to resilience. Since it pertains to the research question, this section begins with a review of hope's properties and theoretical framework.

A Review of State- and Trait-Hope

A prevailing question in the literature of hope asks, ‘Does hope fluctuate sporadically like a state of mind, or does it regress to an expected level like a personality trait?’ Recall that *state hope* reflects the here-and-now levels of hope. It has an ephemeral quality that often stems from the situation. Since hope is a buffer against a range of mental health concerns (Valle et al., 2006), it is important for counselors to grasp whether hope can become steady or trait-like to strengthen mental health. This study’s findings support a hypothesis from Hope Theory (Snyder et al., 1996), which contends that hope functions simultaneously like a state and a trait. Although a person’s level of hope can change like a transitory state of mind, it ultimately regresses to a predictable level over time like a steady personality trait. Furthermore, the findings demonstrate that one’s *trait hope* can also steadily increase with statistical significance over time. The ability for hope to trend upwards due to centering meditation offers implications to counseling and contemplative science.

Empirical Support for Lasting Upward Trends in Hope

Although this is the first study to examine hope through time series analysis, the results support previous findings in the literature. Using a quasi-experimental design, Munoz et al. (2018) found that participants who meditated for six weeks had higher levels of hope than a comparison group. In a study with a cancer patient population, Thornton et al. (2014) introduced treatment with a mindfulness component. The results led to a statistically significant increase in hope over seven months (Thornton et al., 2014). While these studies support my findings, the issue of state- and trait-like fluctuations in hope has important implications for any of the intervention studies on the outcomes of hope. Aside from meditation, the literature shows that intervention studies have a range of little or much success in increasing hope over time.

However, all these studies have relied on pre- and post-test research designs (e.g., paired samples t-test) or longitudinal methods with minimal time points (e.g., ANOVA). Because of the state-like nature of hope, it has been unclear whether these studies captured transient increases in hope. To offer an example, Santani and colleagues (2007) conducted an intervention study to increase hope in a sample of cancer patients over time. They determined that the difference between curative and palliative care on increasing hope was not statistically significant. Using the same population of cancer patients, Rustøen and colleagues (2011) determined that their intervention had a statistically significant increase in hope between T₁ and T₂, but it decreased again between T₂ and T₄. Naturally, these varying outcomes could result from the interventions, but my time series analysis results suggest another question. Since hope has such state-like fluctuations, are the differences in hope from these studies resulting from state-like changes or a statistically significant lasting trend? Consider the ANOVA research designs from these previously mentioned studies that use 3-4 timepoints. Since hope fluctuates from morning to evening, it would be easy for a research study to have very different results on the increases of hope based on whether they collected data in the morning or evening of any particular day. As a result, with these research designs, we can merely generalize that the interventions gave a lasting upward trend hope or not.

Based on my literature review, this is the first intervention study to examine the outcomes of hope through a time series analysis, showing dynamics of hope over 50 time points. The results from this research support many previous meditation studies, and my analysis offers evidence that these interventions can statistically significantly affect the upward trend in hope. The literature has long shown the positive relationship between spirituality and hope (Herth, 1990; Yaghoobzadeh et al., 2018), but researchers are still exploring the relationship between the

two constructs. The literature positions spirituality (when operationalized as transcendence) as a means or pathway to hope (King et al., 2020). King et al. (2020) used path analysis to show how spirituality leads to increased hope ($\beta = .27, p < .000$). This time series analysis offers a microscopic view of this path, magnifying the ups and downs that individuals experience when reaching greater hope. Thus, a recommendation for future research would be to replicate several of the previous intervention studies on hope and incorporate a time series analysis methodology to test whether or not the differences in hope were related to state-like fluctuations or traits that trend upwards.

Summary and Interpretation of Research Question Three

This research question asks if and how hope influences the trajectory of resilience over time. As Chapter Two presented, the field of positive psychology brought forth this question and guided the direction of this study. From this theoretical lens, positive mental health traits such as hope can serve as protective factors against stress and mental illness (Rutter, 1994). The research literature accepts hope as a theoretical psychological dimension of resilience (Munoz et al., 2018), but its longitudinal relationship with resilience had yet to undergo empirical examination.

Hope as a Predictor of Resilience Over Time

As shown in Chapter Four, hope was a statistically significant explanatory variable in the changes of resilience over four weeks. These results are consistent with findings from cross-sectional studies in which hope had a statistically significant correlation with resilience (Dorais et al., unpublished manuscript; Kirmani et al., 2015; Satıcı, 2016). Both studies recruited from a similar university population. In a sample of 98 females entering college, Kirmani et al. (2015) demonstrated a moderate correlation ($r = .39, p < .01$) between hope and resilience. In a sample of 332 undergraduate students, Satıcı (2016) determined almost the exact same results ($r = .39, p$

< .01). My study results showed a higher and stronger relationship between hope and resilience ($r = .47, p < .000$), but it could be a result of hope growing over time. Based on my longitudinal study, hope accounts for a large amount of the variance in resilience over time. The model suggests that resilience will grow in an individual as hope grows over time.

Hope as a Mediator of Resilience Over Time

As mentioned previously, the results of the third research question were twofold. Not only did the analysis determine if hope influences resilience over time, but it also examined how it affects resilience through mediation. In a cross-sectional community sample, Dorais et al. (unpublished manuscript) demonstrated that hope mediated the effect of mindfulness on resilience, $p < .001$. Using these findings as a springboard, I developed a longitudinal within-subject mediation model to examine a similar relationship over time (Bolger & Laurenceau, 2013). In the present study, I modeled hope as a mediator between time and resilience *within* the participants. As we saw from the first research question, resilience grew more in the treatment group than the control group, $p < .05$. However, many participants grew in resilience over four weeks regardless of whether they were in the meditation group or not. I used this opportunity to examine if hope played a mediating effect within each person that grew in resilience. According to the results, hope had a statistically significant mediating role in the changes of resilience over time. In other words, if someone's becoming more resilient as time passes, they are likely becoming more hopeful first. In other words, this spiritual meditation generated a sense of hope in the treatment group, which led to great resilience. In the first research question, based on the randomized control trial, meditation was why someone grew in resilience. Based on the findings, meditation can strengthen resilience, but hope strengthens it more. Regardless of treatment group, if a participant increased their hope by one measurement unit, their resilience would

increase with a slope of .19 units. These findings point to serial mediation which could benefit from future research. In this serial mediation, meditation increases mindfulness, which increases hope. From this point, we see hope increasing resilience.

The findings on the dynamic, mediating roles of hope in resilience offer new information for the literature on hope and resilience. Based on my review of the literature, no research exists on the longitudinal mediating effects of hope on resilience. It is consistent with the findings from a cross-sectional mediation analysis of hope and resilience (Dorais et al., unpublished manuscript), and it offers a new perspective given its dynamic role over time. Using language from emotion dynamics, one could say resilience is a *downstream consequence* of hope (Kuppens & Verduyn, 2017). Researchers generally use cross-sectional mediation models to determine a construct's underlying processes, but they are prone to producing ambiguous or biased results (Jose, 2016). For constructs prone to change over time, the longitudinal within-subject mediation model provided a more reliable view of people's underlying trajectories to reach resilience. Essentially, insight into the dynamic relationship between resilience and hope can improve the understanding and treatment of resilience.

Summary and Interpretation of Exploratory Research Question

The purpose of the exploratory research question was to examine potential determinants of resilience through nonlinear dynamics systems. This research question's findings help extend the theory of resilience by explaining its psychological properties over time. As mentioned throughout the study, resilience is a dynamic process that results from several contributing psychosocial factors (Munoz et al., 2012). As discussed previously in Chapter Two, experts still grapple with the operational definition of resilience because the various psychosocial determinants of resilience still evade us (Southwick et al., 2014). Further, the research suggests

that the dynamics of psychosocial resilience are nonlinear (Pincus & Metten, 2010). Thus, the purpose of this final research question was to use some data from this study and conduct some pilot, exploratory analyses to aid future research further. Although not mentioned in the results chapter, I tested the centering prayer outcomes on spiritual transcendence, mindfulness, and stress and found significant differences in treatment groups. Because it is beyond the scope of this study, I focused on the inner dynamics of resilience based on these constructs.

The literature in positive psychology pointed to potential research areas including spiritual transcendence, mindfulness, and stress (Hanfstingl, 2013; Seligman, 2011). Thus, I examined each of their influence as time-varying covariates of resilience over time. As shown in Chapter Four, each of these factors were statistically significant time-varying covariates of resilience. In other words, resilience may not grow or decrease like a straight line. However, as it moves along its curvilinear trajectory, it keeps a constant relationship with spiritual transcendence, mindfulness, and stress (McCoach & Kaniskan, 2010). To the best of my knowledge, this is the first study examining the longitudinal effects of each of these constructs on resilience. Other studies have shown their measured or assumed relationship cross-sectionally. However, this serves as a pilot analysis for future studies on these constructs' longitudinal relationship with resilience.

Spiritual Transcendence and Resilience

As noted earlier, the empirical literature on the relationship between spiritual transcendence and resilience is sparse (Hanfstingl, 2013). In one cross-sectional study with a sample of German adults, spiritual constructs such as mystical orientation (e.g., spiritual insight) did not predict resilience with statistical significance, $p = .635$ (Hanfstingl, 2013). In this multiple regression analysis, variables such as self-motivation and determination predicted

resilience, $p < .000$. The author's use of the Mystical Orientation Scale (MOS; Schnell & Hanfstingl, 2010) instead of the Spiritual Transcendence Scale (STS) could contribute to the divergent findings with my study. Mysticism is a similar but theoretically different construct from spiritual transcendence. Similar to my study results, correlational studies have shown a significant relationship between spiritual transcendence as measured by the STS and resilience (Hashemi & Jowkar, 2011). In a sample of Iranian adults, each subscale of the STS positively correlated to resilience, $r > .32$, $p < .000$ (Hashemi & Jowkar, 2011). Further, a multiple regression indicated that the subscales of connectedness ($B = 0.30$, $p < .000$) and Universality ($B = 0.19$, $p < 0.01$) predict resilience. Since this study and related studies are all cross-sectional, my study extends the literature to show the significant, longitudinal relationship between spiritual transcendence and resilience.

In the events of COVID-19, researchers have been emphasizing the importance of spiritual transcendence to foster resilience more than ever before (Walsh, 2020). In my examination of this relationship, I sought to begin where recent studies left off. Based on previous studies, spiritual transcendence and resilience appear to have a nonlinear relationship, especially in the face of high levels of stress or trauma. As mentioned previously, Eriksson et al. (2014) demonstrated that deployed humanitarian workers exhibited various trajectories of change in spiritual transcendence over six months. The stability of spiritual transcendence varied depending on their initial values of spiritual transcendence. Further, the class of participants with higher spiritual transcendence had the trajectory with the sharpest decrease in spiritual transcendence (Intercept = 20.46, $p < .001$; Slope = - 0.069, $p < .001$) as compared with the class of initial lower spiritual transcendence (Intercept = 8.37, $p < .001$; Slope = -0.09, $p = .051$). Although the findings show a similar dynamic to my study, it is important to note the measured

constructs of spiritual transcendence were disparate. Eriksson et al. (2014) used the Spiritual Transcendence Index (Seidlitz et al., 2002), which measures subjective experiences instead of traits like the STS that my participants completed. In other words, it is not a fixed personality trait that someone has. Based on this study, the more spiritual transcendence a participant reported to exhibit initially, the more likely it was about to decrease over the next six months of a stressful and potentially traumatizing deployment. My study did not analyze spiritual transcendence based on early spiritual transcendence levels in a latent class growth analysis like Eriksson et al. (2014). Instead, it estimated resilience with spiritual transcendence as a time-varying covariate in a growth curve model. Based on the results, the more spiritual transcendence a person experienced over time, the more resilience would improve.

Stress and Resilience

While the literature on the relationship between spiritual transcendence and resilience is still preliminary, the research on stress is foundational to the theory and operational definition of resilience. Thus, when researching resilience, it is essential to account for stress in the analysis. However, regardless of the theoretical influence stress plays on resilience, very few studies examine it from the perspective of nonlinear dynamic systems (Pincus & Metten, 2010). Resilience is considered a nonlinear adaptation to stress, and yet most of the research consists of linear models that do not necessarily account for or measure stress among participants. The research that does account for nonlinearity tends to show similar results to my study. In a randomized controlled trial on meditation, Gutierrez (2014) found that time and treatment group together do not have a statistically significant interaction effect on reducing stress,

Mindfulness and Resilience

Longitudinal studies on the relationship between mindfulness and resilience tend to be pre- and post-test studies, leaving little insight into their dynamic, nonlinear relationship (Nila et al., 2016). Further, authors would bale the outcome variables as resilience, but they would have separate operational definitions such as ‘stress adaptation’ or ‘quality of life’ (Dyrbye et al., 2017). As a result, the findings to the exploratory research question support these findings while extending the literature with a study that has a clear operationally defined outcome of resilience. As for mindfulness as a dynamic explanatory variable, Kiken et al. (2015) conducted a meditation study and used latent growth curve analysis to estimate trait mindfulness’s trajectory based on changes in state mindfulness. The authors found that individual variances in state mindfulness predicted pre- and post- changes in trait mindfulness. Although their study’s goal differed from the present study, it similarly highlights the dynamic nature of mindfulness in meditation over time.

Limitations

This section presents the limitations to the randomized controlled trial and the statistical analyses in the study. The purpose of listing limitations is to clarify the interpretation, explain the generalizability of findings, and improve future research. The therapeutic intervention was delivered and executed online, a standard method for therapeutic interventions during COVID-19. Although online therapeutic interventions tend to reflect similar results as in-person therapeutic interventions (Andersson & Titov, 2014), there are still several limitations to consider in this study, including self-report instrumentation, accurate records of treatment dosage, and treatment fidelity.

Since the study provided a home-based analysis with purely self-report assessments, each participant was responsible for accurately reporting their treatment doses (length of bi-daily meditation). The study trial examines the dose-response relationship between centering and resilience, so the dose of treatment is a critical component in an RCT (Shadish et al., 2002). To mitigate this limitation, each participant had to include their doses of meditation (minutes spent meditating) to submit their bi-daily surveys. I used a force-response feature on Qualtrics to ensure that they reported their dosage at each survey administration. Participants received payment equally whether they reported low or high levels of meditation. Thus, they did not have a coerced reason to misreport a high dosage.

Since participation in this study was voluntary, participants were free to withdraw from the study at any time of their choice. When the study began, the treatment group and control group each consisted of 95 participants. From T₁ to T₃, the control group decreased by 6% and the treatment group by 35%. The loss of follow-up in longitudinal trials can potentially bias results and violate the assumption that participants were *missing at random* (MAR; Dorais, 2018). After reviewing data connected to participants who did not follow up enough to meet ITT procedure, all missing data appeared to be random and likely does not violate the MAR assumption.

The control group did not practice any other comparison intervention. In general, any intervention is better than no intervention at all (Berg & Høie, 2010). It would be helpful to examine if a comparison group using a non-sense mantra instead of a spiritual symbol would have similar results as the control group in this study. In addition, the factors of other instruments including the STS are not included. Using analysis that takes into account each factor would offer a more comprehensive view of the effect of centering.

Implications for Counseling Practice

Reducing the Research-Practice-Gap

One of the purposes of outcome research is to bridge the gap from research to practice. The *research-practice gap* is a well-documented concern in counseling practice, in which counselors struggle to apply research findings into their real-life clinical practice (Landberg et al., 2018; Wall et al., 2017). Outcome researchers aim to translate their findings by presenting application as evidence-based practice to clinicians. In keeping with this aim, the primary goal of the study was to test the effectiveness of a centering meditation as a counseling intervention and thus reduce the research-practice gap (Landberg et al., 2018; Wall et al., 2017). Centering prayer has long been a spiritual practice (Keating, 2009) and a more recent object of research (Johnson et al., 2009; Ferguson, 2010; Fox et al., 2015; Fox et al., 2016), but it has not been subject to empirical testing as an effective counseling intervention. In the context of this study, I examined the efficacy of increasing resilience based on a spiritual meditation that college students could practice in the counseling office or at home. The study results provide empirical support that a 4-week centering practice effectively increases resilience in college students.

Implications for College Counselors

Based on the target population, the generalizability of the findings has the most significant implications for college counselors. First, it provides an effective home-based or CAM treatment for college students who cannot receive treatment at college counseling centers. Students who use distant learning or remain on waitlists for college counseling could benefit from evidence-based CAM resources such as centering meditation. During this waiting period, the risks of the effects of stress accumulate. This evidence-based centering practice allows counselors to override waitlists and provide a complementary or alternative treatment to

students. Second, as mentioned previously, the rising generation of college students express more interest in spirituality than previous generations (Astin & Astin, 2010). Elaborating on *millennial spirituality* from earlier chapters (Longsdorf, 2018), millennials tend to withdraw from organized religious practice and embrace more contemplative practices such as meditation, yoga, or spiritual practices. In addition, based on self-report in the research, millennials tend to value spirituality as a more significant factor in their wellbeing and holistic health than the previous generation. Thus, to improve multicultural competence, college counselors could benefit from a more comprehensive array of spiritual resources for clients. The centering meditation allows clients to draw from their faith-based practices and implement them into a counseling technique that effectively increases resilience.

Implications for Spiritual Integration in Practice

Beyond college counseling, empirical evidence for centering prayer adds to the resources of integrating spirituality into counseling. The spiritual quality of centering makes it an appealing treatment choice for those who seek spiritual integration in counseling. For instance, individuals with religious or spiritual struggles who desire to incorporate their spirituality into treatment (Exline et al., 2004) may benefit from training in centering prayer. However, before counselors recommend this treatment to clients, it is essential to provide it as an evidence-based practice to the various populations with which clients identify. Further, there is an identified gap in spiritually-integrated, multicultural counseling, and many practitioners state they value spiritual integration but struggle to implement it (Magaldi-Dopman, 2014). This gap could stem from limited multicultural training in the spiritual domain. In general, counseling models that integrate spirituality with counseling treatment are sparse (Stewart-Sicking et al., 2017). After all, spirituality was historically not a part of counseling theory or practice. Since counselors are

rapidly catching up with the need to provide holistic care that incorporates spirituality, they could benefit from a broader range of evidence-based techniques that incorporate spirituality. As shown in the study, centering meditation is mainly self-guided. In this study, its evidence was presented from a home-based online intervention. Thus, it requires little training for counselors and is a useful resource to give to clients.

Implications for Counseling Research

Since the study has multiple research questions, it has many implications for counseling research and practice. In this study, I introduced a relatively unknown meditation to the research literature (not to contemplative practice) and subjected it to experimental design. The outcomes of the trial suggest that centering could have a similar effect on other desired outcomes. The exploratory research results highlight this part of the study. Also, a large portion of this study extended beyond the trial and focused on the emotion dynamics of resilience and hope. This latter portion offers insight into other areas of counseling research that could benefit from such longitudinal approaches.

Centering Prayer Research

Counseling Practice

Based on a review of the literature, this study is the first randomized controlled experiment to test the effectiveness of a centering prayer meditation. In a pilot study of centering prayer on psychospiritual outcomes, Fox and colleagues (2016) recommended experimental design for the next research step on centering prayer. Based on the pilot study results, Fox and colleagues (2016) recommended future research to incorporate mindfulness and spiritual factors of centering. Now that the trial established a causal effect of centering prayer on resilience, it encourages research to examine its effectiveness as an intervention in other related outcomes

(e.g., reduced anxiety and increased wellbeing). Another potential mediation model would be a spirituality longitudinally mediating the effects of centering on resilience, since spirituality is a covariate of resilience.

Contemplative Pedagogy

Furthermore, as a contemplative practice, the effectiveness of centering prayer also has implications for counselor education. Contemplative pedagogy uses contemplative practice in teaching to promote inner awareness and reflection in learning (Zajonc, 2013). Because centering prayer was effective on a university population, it suggests its effectiveness as part of instruction with this same population. Contemplative pedagogy in the classroom can include reflective journaling, poetry, music, and guided meditation. Although it has gained popularity in recent decades, empirical research has yet to catch up to it. This study has implications for counseling research in the effectiveness of counselor education potentially.

Temporal Dynamics

With a research design rooted in temporal dynamics, this study extends beyond the effectiveness of meditation and examines its dynamic, underlying processes that lead to its effectiveness. Temporal dynamics is the study of time-based patterns and interactions and is evolving rapidly in social science research. As pioneers of emotion dynamics, Kuppens and Verduyn (2017) encourage researchers to try new combinations of data collection methods, analysis, and subject matter to demonstrate the use of emotion dynamics in social science. I used this method to examine the dynamics of hope and resilience and hopefully shed light on dynamics that could spur further research in this area. The findings answered several research questions but encourage several other research questions. For instance, if hope was such a significant longitudinal mediator of resilience in the college population, it begs the question of

whether or not hope potentially mediates other desired outcomes for this population (e.g., reduced anxiety, flourishing, a sense of purpose).

Beyond the role of within-subject mediation, this study's modeling procedures also shed light on the dynamic inner workings of resilience. Although hope, spiritual transcendence, stress, and mindfulness explained a large portion of the variance in resilience, it still left much of the variance up to other predictors or randomness. The study's scope and purpose limited me to those variables, but the theory in positive psychology and previous research imply the presence of other significant time-varying covariates. All of these variables can provide insight into resilience based on a replicated research design of this study. Furthermore, with their significant influence on resilience, it also implies that they could be significant covariates for other desired psychosocial outcomes.

Lastly, as I mentioned previously, the time series analysis offers a microscopic lens to the changes we see in many pre- and post-test analyses. This lens was helpful when examining the changes of hope because it naturally exhibits a fluctuating-by-state movement. Snyder's Hope Theory highlights this dynamic, and the time series analysis demonstrates it. Based on the graphs, a repeated-measures ANOVA could produce contrasting results depending on the chosen time points. Since the average levels of hope moved so much, time series analysis was essential to show a statistically significant trend over time based on all the time points in the meditation group.

Recommendation for Future Research Studies

Extending Intervention to New Populations

Because of the limitations and the implications of the study, the subject area of the study could benefit from further research. This next section consists of an outline for recommendations

for future research. First, one recommendation is to replicate this randomized controlled trial on another population besides college students. A replicated study would expand the generalizability of the findings to new populations, and many populations could also benefit from CAM interventions like centering. The results from this study are about the efficacy of centering prayer and its effectiveness as an online intervention. Many populations could currently benefit from an online CAM intervention, such as patients with chronic illness or geriatric population. The events of COVID-19 alone have informed the counseling field of the need for effective online CAM interventions. Thus, the generalizability of this study could benefit from future research with various populations in need of an online intervention that bolsters resilience.

Measuring New Outcomes from Centering Prayer

A second recommendation is to replicate the study on a new outcome besides hope or resilience. The exploratory research questions asked about the relationship between resilience and the constructs of spiritual transcendence, stress, and mindfulness. The results showed that these variables all served as explanatory variables in the changes of resilience. Although it was beyond the scope of this study, the findings provide a basis to measure the outcomes of stress, spiritual transcendence, and mindfulness based on centering prayer. The fields of contemplative science and positive psychology already give a theoretical basis to test the efficacy of centering on these constructs, and previous literature supports it as well. For instance, the findings indicated that spiritual transcendence could potentially moderate hope in the relationship between centering and hope. Greeson et al. (2014) demonstrated the effectiveness of online, nonsectarian mindfulness meditation in reducing stress among college students. Gutierrez and colleagues (2016) demonstrated the efficacy of a Jyoti meditation on decreasing stress in

counseling students. Thus, the research literature provides a basis to test the efficacy of centering prayer on reducing stress. Meditation studies often demonstrate an increase in mindfulness (Kiken et al., 2015), suggesting a similar outcome for centering prayer. Spiritual transcendence has been subject to less scrutiny, and it had the largest slope as an explanatory variable to resilience in this study. Thus, studying the outcomes of spiritual transcendence may offer more novel findings to the meditation literature. The findings from this research could expand the use of centering prayer as a counseling intervention.

Furthermore, another opportunity for research pertains to the target population. Approximately a third of my participants did not affiliate with either religion or spirituality. Nevertheless, they continued with the centering meditation and still apparently exhibited the benefits of it. Another study could potentially explore this phenomenon, perhaps comparing a group who does not affiliate with religion or spirituality with a group that does. The findings from this study could have major implications for spiritual integration in counseling practice.

Examining Traits and States of Psychosocial Constructs

In terms of the second research question, the time series analysis revealed underlying dynamics in longitudinal studies. This analysis is especially important for constructs like hope that tend to fluctuate or be unstable over time. As I mentioned earlier in this chapter, a pre- and post-test offers limited evidence of actual change. ARIMA models account for natural fluctuations, estimate a fitting model, and forecast future observations. Thus, a recommendation is to replicate many previous studies of unstable measured constructs and examine change through a time series analysis design.

The last recommendation on the trial portion of the study is to use an in-person training instead of an online training method. This recommendation addresses several of the limitations I

mentioned earlier in the chapter. In terms of treatment dosage, the in-person component can ensure an exact and equal treatment dose for each participant since everyone would practice the meditation together. Further, online studies generally rely on self-report measures, but in-person studies can benefit from biofeedback measurements. These measurements have their limitations as well, but their results could provide evidence for criterion-related validity.

Conclusion

The restate the aims of the study, the primary purpose was to test if centering prayer could increase resilience among college students. While meditation is a widely accepted agent of change for mental health outcomes (Sedlmeier et al., 2012), centering prayer's effectiveness did not yet have empirical evidence (Fox et al., 2016). Further, the relationship between meditation and resilience is still unclear in the literature (Waechter & Wekerle, 2015). The secondary purpose was to examine the underlying dynamics that led to changes in resilience. Based on a recommended sequence in outcome research, the steps are to a) test *why* an outcome like improved resilience took place and b) examine *how* the outcome took place (Fortes et al., 2005; Petriks & Cronin, 2014). With an RCT design, the centering intervention answered the ‘why’ question. Temporal dynamics can answer the ‘how’ question (Kuppens & Verduyn, 2017) by examining relationships with time-varying covariates. For the purposes of this study, I narrowed the potential pool of influencing variables to hope, mindfulness, stress, and spiritual transcendence. These variables had theoretical significance to the study and a gap in the research about their relationships with resilience. Through growth curve modeling, I found that each variable served as significant explanatory variables of the changes in resilience over time. Also, as the longitudinal within-subject mediation model presents, a person’s changes in resilience were partially due to their changes in hope. Lastly, I examined hope between the treatment and

control groups through an ARIMA time series model. Centering prayer caused a statistically significant upward trend in hope. The levels of hope in the control group were stationary over time and had more variance than the treatment group.

Previously in this chapter, I reviewed a concise set of limitations of the present study, including the limited generalizability due to convenience sampling and limited accuracy of treatment dosage due to self-report measurement. A large purpose of the limitations was to improve future research that aims to build upon this study, which I have also outlined in this chapter. Most of all, this chapter's primary purpose and the overarching purpose of the study are to offer implications for the counselors in the field. This study provides the college population an evidence-based practice for improving resilience which individuals can use at home or with their counselors in session. Records of the psychological benefits of this lesser-known spiritual practice exist over centuries (Keating, 2009). As centering prayer shows a resurgence in the wellness practices today (Fox et al., 2016), this study now provides the first empirical evidence of its mental health benefits and hopefully paves a path for further research on the effectiveness and dynamics of centering prayer.

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APPENDIX A: SAS SYNTAX

Model	SAS Syntax
Model A Unconditional Growth Model	<pre>proc mixed data=WORK.final method=reml plots=(residualPanel influenceStatPanel) alpha=0.05 covtest; class id; model RSES= Time/ solution cl covb; random Intercept Time / type=vc subject=id; run;</pre>
Model B RQ1	<pre>proc mixed data=WORK.final method=reml plots=(residualPanel) alpha=0.05 cl covtest; class id; model RSES=Group Time Group*Time / solution cl ddfm=kenwardroger alpha=0.05 alphap=0.05 covb; random Intercept Time / type=VC subject=id; run;</pre>
Model C RQ3	<pre>proc mixed data=WORK.hope method=reml plots=(residualPanel influenceStatPanel) alpha=0.05 covtest; class id; model RSES= Time hope time*hope / solution cl covb; random Intercept Time / type=vc subject=id; run;</pre>
Model D Exploratory RQ	<pre>proc mixed data=WORK.final method=reml plots=(residualPanel) alpha=0.05 covtest; class id ; model RSES= Time sts time*sts / solution cl ddfm=kenwardroger alpha=0.05 alphap=0.05; random intercept Time / type=vc subject=id; run;</pre>
Model E Exploratory RQ	<pre>proc mixed data=WORK.final method=reml plots=(residualPanel) alpha=0.05 covtest; class id ; model RSES= Time cams time*cams / solution cl ddfm=kenwardroger alpha=0.05 alphap=0.05; random intercept Time / type=vc subject=id; run;</pre>
Model F Exploratory RQ	<pre>proc mixed data=WORK.final method=reml plots=(residualPanel) alpha=0.05 covtest; class id ; model RSES= Time pss time*pss / solution cl ddfm=kenwardroger alpha=0.05 alphap=0.05; random intercept Time / type=vc subject=id; run;</pre>

APPENDIX B: INFORMED CONSENT

Introduction: You have been invited to participate in a research study entitled *A Longitudinal Study on Hope and Stress Response in the College Population*. This study is being conducted by Stephanie Dorais, a PhD candidate in counselor education at the College of William & Mary in the School of Education, under the faculty supervision of Dr. Daniel Gutierrez, Ph.D., LPC, CSAC.

Purpose of the research study: The purpose of this study is to explore the relationships between daily levels of hope and stress response. The goal is to have around 100 individuals complete this study. In order to participate you must be a) at least 18 years of age, b) currently enrolled part time or full time in college or graduate school, and c) have access to internet at least twice a day.

What you will be asked to do: The data collection of this study will take place over the course of the next four weeks. Each day, participants will be asked to complete a brief, relaxation exercise once in the morning and once in the evening. After each exercise, participants will be asked to complete a brief questionnaire, which requires less than 1 minute to complete.

Confidentiality: The survey is anonymous, and your participation is confidential. Please do not type your name anywhere on this survey. Your data will not be associated with your name or any code so that your responses cannot be linked to your name in any way.

Voluntary participation: Your participation in the research is voluntary. You may choose not to answer any or all questions, and you may stop at any time. There is no penalty for not taking part in this research study.

Location: This is an online-based study. You can complete the surveys at any location of your choosing.

Incentive for Participation: All participants will be compensated weekly with a gift card in the amount of \$5. In order to receive the gift cards, the PI will verify that at least 50% of surveys are completed. In addition, participants will receive a \$5 card upon completing three larger questionnaire sets at the beginning, middle, and end of the study. The full compensation that a participant can receive for active participation is \$35.

Potential Discomforts and Risks: There are no known risks associated with this study. You will be simply asked to respond to several survey items and participate in a brief exercise.

Potential Benefits for Participating in the Study: Participants can potentially receive the physical and mental benefits of various relaxation exercises. This research will provide insight into the relationship among relaxation, hope and stress response for the college population.

If you have any questions regarding this study please contact sdorais@email.wm.edu

This project (protocol number EDIRC-2020-08-02-14426-sdorais) was found to comply with appropriate ethical standards and was exempted from the need for full review by the College of William & Mary protection of human subjects committee (phone 757-221-3966) on 2020-08-31 and expires on 2021-08-31.

You may report dissatisfaction with any aspect of this study to Dr. Jennifer Stevens, the Chair of the Protection of Human Subjects Committee by telephone (757-221-3862) or email (jastevens@wm.edu).

Once you have selected the response below, click the forward arrow link (-->) to go to the next page.

Thank you for your consideration!

- Yes (This response will continue the study)
- No (This response will close out the study)

APPENDIX C: INTRODUCTION TO THE STUDY

<https://youtu.be/dcKRqq9I5TU>

Transcript

Hi. Thank you so much for your interesting in joining this study. My name is Stephanie Dorais. I'm a Phd Candidate in Counselor Education, and I'm also a licensed counselor, and I work a lot with university students like yourself. And this whole study is for university students. We're trying to learn about student coping, goal-attainment, and relaxation, which are some of the benefits that I'm hoping that you'll experience as you follow this study. So you'll be following along for four weeks, and you can get paid up to a total of \$35, given in installments if you follow along the study.

You're going to start out by taking a group of assessments which won't take longer than 5 -7 minutes to complete. Then you'll be taken to the next portion of the study, which includes a very brief assessment—it's only 6 questions long. You will be emailed this assessment every morning and every evening for the remainder of the study. In order to get paid every week, you're going to want complete at least 50% of these surveys. It's okay on some days if you forget or fall behind. Just continue along, and you can get paid the following week on Saturday.

So if you have any questions at all, please don't hesitate to reach out to me (sdorais@wm.edu). I will get back to you. And thank you again for joining this study.

VITA
Stephanie Dorais, PhD, LPC, NCC

- 2021 **Ph.D. in Counselor Education and Supervision** | William & Mary School of Education
- 2016 **M.A. in Clinical Mental Health Counseling** | Regent University School of Psychology & Counseling
- 2012 **B.S. in Statistics and Operations Research** | NYU Stern School of Business

RESEARCH GRANTS

Dukes, A., Principal Investigator. Co-Investigators, **Dorais, S.** & Gutierrez, D. *Increasing Female Inmates' Hope and Resilience*. International Association of Addictions and Offender Counselors, \$500. Awarded April 2020. Funded.

Dorais, S., Principal Investigator. Co-Investigator, Gutierrez, D. *A Longitudinal Randomized Control Study of Wellbeing Following Trauma Among College Students*. American College Counseling Association. \$1,000. Awarded February 2020. Funded.

Dorais, S., Principal Investigator. Co-Investigator, Gutierrez, D. *A Brief, Trauma-Informed Workshop Intervention to Reduce Stress and Promote Wellbeing Among Virginia College Students*. Virginia Association for Counselor Education and Supervision, \$500. Awarded February 2020. Funded.

RESEARCH

Dorais, S., Gutierrez, D., & Gressard, C. F. (2020). An evaluation of Motivational Interviewing based treatment in a university addiction counseling training clinic. *Counseling Outcome Research and Evaluation*, 11(1), 1 – 12. <https://doi.org/10.1080/21501378.2019.1704175>

Wood, A.W., **Dorais, S.**, Gutierrez, D., Moore, M., & Schmit, M. (2020). Advancing the counseling profession through contemporary quantitative approaches. *Journal of Counseling & Development*, 99(2), 156-166. <https://doi.org/10.1002/jcad.12363>

Gutierrez, D., **Dorais, S.**, & Goshorn, J. (2020). Recovery as life transformation: Examining the relationships between recovery, hope, and relapse. *Substance Use & Misuse*, 55(12), 1949 – 1957. <https://doi.org/10.1080/10826084.2020.1781181>

Gutierrez, D., Mason, W. N., **Dorais, S.**, & Fox, J. (2020). Gradually sudden: Vital spiritual experiences and recovery. *Spirituality in Clinical Practice*. Advance online publication. <https://doi.org/10.1037/scp0000218>

Gutierrez, D., **Dorais, S.**, Smith, J., & Mutanguha, F. (2019). Humanity Education as a school-based intervention for healing. *Journal of School-Based Counseling Policy and Evaluation*, 1(3), 62 – 70. <https://doi.org/10.25774/6rgw-bn52>